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THE ODONTALGIST:

OR,

HOW TO PRESERVE THE TEETH.



THE ODONTALGIST :
OR,
HOW TO PRESERVE THE TEETH,
CURE TOOTHACHE,
AND REGULATE
DENTITION FROM INFANCY TO AGE.

BY
J. PATERSON CLARK, M.A.,
DENTIST EXTRAORDINARY TO
HIS ROYAL HIGHNESS PRINCE ALBERT, ETC.



"Vive, vale. Si quid novisti rectius istis
Candidus imperti : si non, his utero mecum."—HOR.



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PREFACE.

THE principal object of the following Commentaries on the diseases of the teeth, gums, and sockets of the teeth, and on the causes which produce them, is to assist in popularizing whatever is already known of their prevention and cure, as practised, at the present time, in the highest circles of English society ; to which are added instructions, with various opinions, for regulating and managing the teeth from infancy to age.

Caries, decay, or rot in teeth, was long supposed to have a mysterious origin within them—a species of gangrene of the bone, arising from inflammation of particular spots,—the source or cause of which no one pretended to guess ; instead of what it assuredly is, the mere softening of the bone from natural causes, the teeth being, unlike other bones, openly exposed to atmospheric

influences, and under circumstances particularly favourable to decomposition. We accordingly find that their decay, like rust in steel, invariably commences at the surface, and in the same spots of corresponding teeth, whether they be real or artificial, in all mankind. This indecision as to the cause of caries greatly tended to discourage the attempts made to save teeth, when once seriously attacked by disease; and more especially so as it was found that the stoppings or fillings, which were intended to preserve them, for want of a more general and true apprehension of their application and use, did not always prove permanently successful. The filling put into a decayed tooth was often expected to act more as a charm than as a real and efficient plug; and when the original cause of decay—the habitual lodgement of decomposed food—was overlooked, and permitted to remain as formerly, the walls of the stopped cavity began to soften afresh, when, as a matter of course, the hole became larger and the metal dropped out.

A different and more hopeful system is fast gaining ground. It is beginning to be generally felt that, with successful daily brushing and other

available simple appliances, caries in teeth, and along with it toothache and loose teeth, can be altogether averted, and even remedied, to an almost unlimited extent.

The following valuable and suggestive hints on decay were first thrown out by the celebrated John Hunter, in his "Treatise on the Teeth," published about a century ago; although but little noticed, or improved on, by his numerous admiring followers.

"The decay of teeth did not appear to be so"
"much a matter of accident after all, as it always"
"appeared in the same dark lines and cracks"
"natural to all teeth." Further on he recommends that "the cracks be filled up with lead" (the stopping material of his period), "which was"
"sure to retard, if it did not altogether prevent"
"further decay." With the experience of a dentist Mr. Hunter would undoubtedly have found out that the filling prevented further decay just as long as it effectually excluded air and moisture from the seat of the disease; on the same principle that a good cork saves the wine, or as filling up cracks prevents rot in standing trees. Mr. Fox afterwards called attention to the fact, that

caries commenced at the surface, and that the bone would always be found healthier the deeper it was cut into. After Mr. Fox, Mr. Parmly, an American dentist, then practising in London, in his clever treatise, ascribed the origin of caries to the relics of food habitually permitted to remain and rot about the teeth.

The following extracts will further explain the progress of public opinion on the subject. In the "American Journal of Dental Science," for September of the year 1841, we find the following remarks, in a review of a work, just then published, by Mr. Robertson, of Birmingham; who appears to entertain the same views as those first promulgated by the author of the following Commentaries, in a small treatise, published for him twelve years before, by the Messrs. Longman and Co., in 1829. "The unphilosophical and erroneous " doctrine that caries of the teeth is the result of " inflammation of their bony structure, is, we are " gratified to learn by the above treatise, (Mr. " Robertson's), and other European publications " on the teeth, not universally held by our pro- " fessional brethren on the other side of the " water."

The following remarks of Doctor Samuel L. Mitchell, of New York, when writing to Dr. Hope, of Edinburgh, in 1796, and subsequently published in the New York "Medical Repository," in the year 1805, became known to the author lately :—" That an acid is formed in the mouth, " and supposed to be the result of a chemical " decomposition of lurking particles of food and " other extraneous matter about the teeth, which " decays them."

In the same "Medical Repository," for the year 1813, we find Professor Hayden, Baltimore, expressing it as his opinion that he "feels no " hesitation in saying that the decay of the " human teeth is occasioned almost universally " by an acid or otherwise morbid secretion from " the mouth and gums."

Such were the approaches made towards the discovery of the true cause of decay in teeth, and to a consequently easy and certain mode of treatment.

The practice of preserving, or rather of trying to preserve teeth, by filling up decayed holes, is probably as old as extraction itself; but as the operation sometimes occasioned pain, many teeth were willingly, though unnecessarily sacrificed,

rather than submit to it—"One great pain and done with it!"

The author claims the invention of a method of rendering tender teeth insensible to touch—at least as much so as sound ones—previous to the operation of stopping them permanently with metal, or of filing away the carious parts. His system of treating tender teeth, toothache, spongy gums, retreating sockets, acid saliva, tartar, stoppings, cleaning, and the management of dentition, will be found fully explained under proper heads, in the body of the work. He rests his claim to the attention of the public on its own interests; and on his long practical experience of thirty years' standing in the particular departments of his profession which he has here attempted to describe; and by means of which he has arrived at the conclusion, that toothache and the loss of teeth can, with common care and management, be rendered unknown complaints.

If any of his statements should appear startling, he refers with confidence to his successors in business, who, as they possess a still growing professional connexion—already one of the most extensive of its kind—are in a position to prove their accuracy.

There are other causes for the loss of teeth besides caries ; teeth loosen and drop out, partly from the jar of one row on the other during mastication, when a certain number of the molars have been lost, and greatly from the accumulation of tartar on the teeth.

Tartar or fur, consisting of carbonate of lime, animal, and other matters, is the solid part of the saliva, and is precipitated over the whole mouth when the jaws are at rest ; though it is afterwards wiped away, while yet in a soft state, from every point subject to friction. The intervals between the teeth—which increase in size as the gums recede—and those other spots of them not touched or rubbed by the tongue, lips, and food during mastication, retain this salivary deposit—unless it be removed with a toothbrush—till it becomes the stony calculus known as tartar. Tartar separates the gums from the teeth, and in so doing renders them spongy and apt to bleed,—the condition considered scorbutic ; and, underneath scorbutic gums, the sockets of the teeth are invariably undergoing the hidden process of absorption or loss of substance, when the teeth, as a matter of course, loosen and drop out.

The structure of the teeth enables them to resist decomposition more than any other part of the animal body ; and yet, during life, they are generally the first to decay. It only requires to know the causes in order to obviate them.

The body makes its entrance into the world without teeth, and, not unfrequently, leaves it in the same condition, but without occasioning any such palpable injury as the loss of almost any other part. The teeth and the sockets in which they are fixed are, scientifically, considered in the light of painful, though useful intruders—mere exerecenees—forced upon a system already apparently complete without them. They are added to the original jaw-bones, displacing and painfully swelling up the gums through which they have at last to pass, and in which they stick half through—a permanent source of irritation in the holes they make—unless when otherwise favourably placed by nature, or skilfully managed by art. The difficulties of management will be found readily to disappear before a true knowledge of the sources of irregularities, and of the causes which produce them, together with that of the actual seat of every dental pain.

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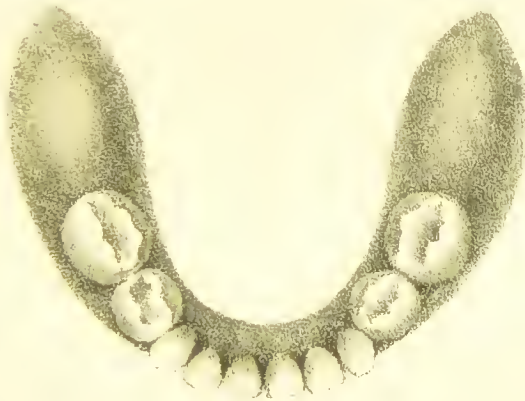
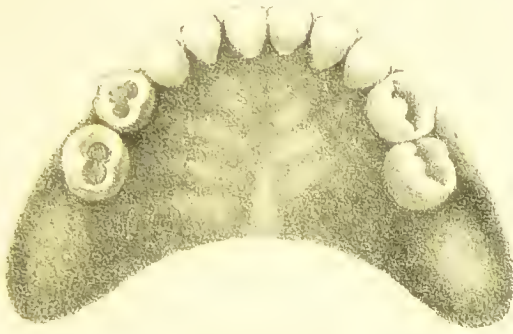
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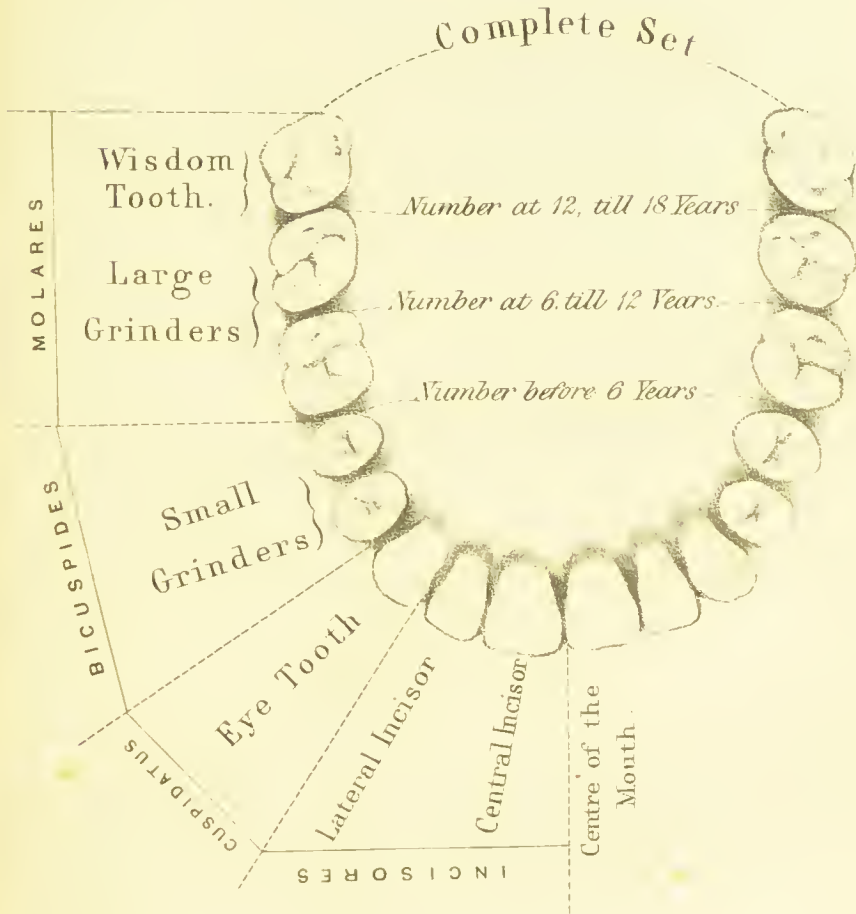


and Lower

JAWS of a CHILD at 6 Years of Age.



Upper Jaw.



A D U L T M O U T H .





Dissected Jaws of a Child at 6 Years.

*Showing the full complement of the shedding Teeth,
& the situation of their Successors.*



COMMENTARIES
ON
DENTAL PRACTICE.

~~~~~  
TOOTHACHE.

FEW persons require to be told what toothache is, but fewer still appear to know how much of their painful experience of it is due to themselves, or to the neglect and mismanagement of others. This arises chiefly from ignorance of its predisposing causes, of the parts usually subject to its attacks, and, consequently, of those diseases which occasion it, and which can easily be prevented at first, and greatly modified, if not absolutely cured permanently, at later stages.

Toothache is capable of being traced to its origin in every case, and accounted for as satis-

factorily as most other common complaints, and, notwithstanding its proverbial waywardness, it can, like them, be made to yield to medical, surgical, or mechanical treatment, which latter is preferable, provided the organ or part affected, and the particular stage of disease which gives rise to the pain at the time, be ascertained and attended to.

Without this no relief can be permanent, for toothache, or rather the diseases which produce it, or more correctly still, the organs subject to those diseases, often decay and waste away entirely unless they be checked by art, but by degrees so slow as to be quite manageable. At earlier stages especially, dental diseases, like those of the lungs, can be beneficially arrested though the lost substance cannot be restored or vacancies filled up, as in other parts of the body, the teeth possessing no natural reparatory power.

The organs here meant are the teeth themselves, the fleshy pulps within them, the bony sockets in which they are fixed, and the lining membrane—called the periosteum—placed like a stocking, between their roots and sockets; all or any of which, when left to undisturbed decay,

are sure to be totally destroyed at last. This consummation of such a case, however, rarely takes place without due warning, for the part affected by disease is usually so susceptible of pain, from even the most trifling exciting cause, that, exhausted at last with long-continued suffering, the most timid are forced to submit to timely precautionary measures, or to what they more heartily dread—horrid extraction. The natural termination of unchecked inflammation of the membranes is gum-boil, which may have its origin in the pulp of the interior of a diseased tooth, or at the outside of its root in the lining membrane of its socket, from either of which points, before it can afford relief from toothache, it has to eat its painful way through the bone and gum to the surface. Gum-boil, nature's remedy for toothache, occasions, while it is forming, the most severe of all ordinary aches, and its seat is the least accessible to direct treatment; when, however, it has opened a way through the jaw to the gum, which it swells at the part, relief may be obtained by surgical means—the employment of a lancet to open an artificial way for the long-pent up matter rather than wait till the boil

breaks or disperses naturally ; and, although gum-boils sometimes form imperceptibly and even burst without pain, they are, in general, and independently of their own peculiar sufferings, preceded by all the accumulated evils usually attendant on neglected teeth.

Those who may have already suffered, especially if they be timid, and opposed alike to extraction and the operations required for preserving teeth, can well understand the first approaches of toothache, and dread them ; but others who have had no such experience ought, if possible, to be forewarned and placed on their guard, should they feel so inclined, against evils as insidious as they are destructive and certain, and which, when rightly understood, are neither difficult to prevent or cure.

When heat, cold, acids, or other accidental influences begin to affect one tooth more painfully than the rest, it is reasonable to suspect the existence of incipient decay of the bone, or inflammation of some of the connecting membranes, whether owing to its situation it can be discovered or not ; and no pains therefore ought to be spared in tracing it out ; but when an occasional sudden

twitch is felt, there can no longer remain any reasonable doubt on the subject, decay or inflammation, or both, are surely going on, and their seat and cause ought to be ascertained at all hazards. If, however, the case be neglected, a continuous gnawing ache with occasional paroxysms of stunning plunging pain ensues, or at other times a dull heavy neuralgic sensation is experienced, the effects of which are sometimes painfully felt to the very extremities of the body ; and in such cases it not unfrequently happens that a bad tooth gives rise to what may be mistaken for *tic-douloureux* from other causes, and treated accordingly, or abandoned, in despair, to time, patience, and gum-boil. The cause of mistaking this complaint often arises from the difficulty experienced in discovering the diseased tooth, or even the jaw in which it is, until at last one tooth becomes loose and longer than the rest, betraying the source and origin of all the evil. In this state the tooth no longer aches till pressed on ; for now, as roots are smaller towards their tips, the inflamed and swollen membrane finds room to expand at the bottom of the socket which relieves the excited nerves from pressure, as in

soft parts of the body, where after the first incision no more than a dull pain would be produced by handling.

A tooth in this state is not easier to extract than at other times, for roots diverge, and when the inflammation subsides the tooth sinks into its former place, and after a first or even a second attack, becomes firm and useful as before. But if the original cause of the inflammation, which, perhaps, the mere touch of a file, a slight stopping, or special cleaning, would have permanently removed in the first instance, be not discovered, and that the attacks continue to return as to a weak point on every slight derangement of the bodily system, the total destruction of the part, be it tooth or its internal pulp, socket, or its lining membrane, is as certain as anything already accomplished.

Toothache does not take place spontaneously, any more than combustion, without the presence of an exciting cause, in addition to the proper materials for it to feed on; nor do the common causes of toothache produce it in sound teeth fixed in healthy sockets and gums, unless it be for an instant, as when touched by ice or

acids for example, and then it passes off as soon as the ordinary temperature and cleanliness of the mouth are restored. But when in consequence of disease of the bone, internal pulp, the periosteum, the sockets, or even the gums, the teeth are predisposed to ache, pain once excited continues long, or until proper means are taken to relieve it.

In order to manage teeth successfully, it is advisable first of all to be acquainted with the causes which produce those diseases that predispose them to ache; which, on investigation, will, in general, be found to be very simple, and of easy prevention or cure, by mechanical means only, requiring no more, perhaps, than to file off a sharp useless point of one tooth jarring on another; the worst forms of jaw diseases are sometimes produced in this way; or it may be a case of incipient decay, requiring but special cleaning every day; or, if more advanced in disease, merely filling up the hole with metal; or, if too tender for that treatment, to be soothed with anodyne cement, to be described presently in its proper place, or anything better, if it can be had, previous to a permanent metallic stopping. Tooth-

ache differs from other pain only because the parts that ache and their nerves are differently placed and circumstanced from other parts and their nerves. The nerves and blood-vessels of the teeth are confined to limited spaces which they cannot pass, being bounded by rigid unyielding walls of bone within the teeth themselves, or between their roots and sockets, as in a vice, situations which they fill completely even in the healthy state, so that, when they happen to be inflamed and swollen by disease they have no room to expand as in fleshy parts, and they, consequently, suffer more acutely than other nerves. The prick of a pin is quite as painful anywhere else as in a tooth, and pain ceases in the one as readily as in the other on the removal of the exciting cause, but if inflammation be permitted to take place in both, the analogy between them, so far at least as the quality of their pain is concerned, immediately ceases, for in the one it is dull and inclined to pass off, while in the other it increases in intensity.

Toothache, it is unnecessary to say, is relieved at once by the extraction of the offending tooth; when it happens to be otherwise the pain is con-

tinued for some time longer in the contiguous parts, which had participated in the inflammatory action, within the tooth or in its socket ; it ought, however, to be looked upon as bad practice to break up the dental arch, on slight occasions, instead of repairing it,—to excise the limb in place of effecting its cure.

Inflammation of the membrane which lines the socket of a tooth may take place whether the tooth be sound, that is whole or not, for when a tooth in one row jars upon its opponent in the other, from the loss of its former supporters, on breaking up the arch on either side, the action is the same as shaking a post in the ground, till it loosens, when the membrane is sure to be the principal sufferer. The socket of the tooth in this case, may be aptly compared to a mortar, with the tooth for a pestle, and the action of the jaws in mastication for the lusty hand which wields it in mercilessly pounding the skinny membrane placed between them, till it inflames, thickens, and becomes fungous or ossified, occasioning gum-boil as the mildest result ; and failing that, a gangrenous absorption of the root, commencing at its point ; but, fortunately when

that does occur, exhibiting warning signs outside the cheek, of red spots and ugly swellings, which ought never to be overlooked, nor the offending tooth permitted to remain any longer.

In cases of this description, taken in time, a few judicious touches of a file would often remove the points of contact and prevent further mischief, or if too far advanced for that treatment, artificial substitutes for adjoining lost teeth, might be advantageously employed to keep off the pressure.

Inflammation of the same parts, attended by similar circumstances, sometimes follows an operation on decayed teeth when the stopping has been delayed, for then the vessels of the interior, from long continued ulceration, which has at last become chronic, will not bear to be closed over, and we often find, on the removal of the plug—a preferable plan to extraction in such a case—that blood or matter will flow from the cavity as from a boil, and afford relief.

The absence of pain is no proof that a long-neglected tooth would bear filling, and the same ill consequences might attend the operation even after the tooth could bear probing to the very tip

of its root without pain, for the blood-vessels and nerves of the interior of a tooth are often absorbed while the bony structure remains with only a hole, perhaps, in its side or crown. Pain after stopping would prove either that ulcerating membrane still remained in the natural channel of the tooth, or that chronic inflammation had seized upon the periosteum which could only be relieved through the medium of a gum-boil, or of the air-hole in the tooth to which the latter had become accustomed. Temporary filling, to be always removed on the approach of pain, would in the end cure such a case by gradually habituating the tooth to bear a permanent plug. One case of this description will serve to illustrate a great many. The author is now acquainted with a large molar, its possessor's best tooth for nearly twenty years back, which would not bear the filling at first without the return of pain for more than a few weeks at a time. The tooth was of too much importance to be sacrificed on slight grounds, and its possessor was patient. The filling (tin) was removed as often as pain returned, and the anodyne cement applied instead for a space of two years; in the third year the

filling no longer occasioned pain, and it remains, up to the present day, sound, sweet, and useful.

Pivoting a tooth on a root sometimes occasions pain of the description here alluded to, unless the gold pin which fixes it be fitted loosely at first, so as to admit of removing the tooth as often as it may be required to allow matter and blood to escape, and so prevent gum-boil, the painful method of effecting a cure. After a time, a tooth thus pivoted, when fixed permanently, occasions no pain.

Allied to such pain and suffering, and equally severe while it lasts, in many instances, is dentition. Not only has the new tooth to be formed to its full size underneath the gum, which it has at last painfully to cut through, but the bony socket in which it is to be fixed has also to be added to the original jaw-bone, a new storey raised upon the original wall, upheaving and slowly distending the gum, which is only relieved at last by the birth of the tooth. It will thus be understood why lancing the gum affords relief to painful dentition. All children do not suffer alike from dentition, some, from great constitutional strength, being scarcely conscious of any change taking

place. The exciting cause—the birth of a new tooth—however, occurs twenty times during the first dentition, or before the end of the third year of age; and twelve times afterwards, in or about the sixth, twelfth, and eighteenth years of age, when new teeth are added at the extremities of the still growing jaws to complete the complement of thirty-two permanent teeth; the successors of the first or shedding teeth giving little or no pain as the way is already comparatively open to them. Dentition is here noticed only because the constitutional disturbances attendant on the cutting of permanent teeth are not so generally known, or rather the cause of them not so well understood as it deserves, and which is, in fact, nothing more than concealed neuralgia.

In order, if possible, the better to understand what has already been said above, as well as what is yet to follow in the way of advice for the prevention and cure of toothache, it may be desirable to examine separately, and with some minuteness, each of the parts in which the pain usually originates, when it will be seen that it would be quite as reasonable to expect a panacea for the cure of all diseases as for toothache, in

all its stages and varieties. It is so far unfortunate for this species of suffering, that the pain only is thought of, while the condition of the disease which causes it is overlooked.

A tooth then resembles a bottle more nearly than anything else, only formed with thicker walls, and a comparatively small chamber within, and with two or three necks instead of one in some cases. If we now suppose the bottle to be completely lined inside with a skinny membrane interwoven with nerves and blood-vessels, and this membrane rising out of, and falling partly over the neck of the bottle like a collar, and partly sending out shoots which are to enter the bodily system, and in that state plunged, neck forward, into a soft paste, which would suddenly harden to bone, and become the future sockets of the teeth,—we have, so far as concerns our present purpose, something like a true picture of a tooth with its vital connecting membranes.

The collar here meant is the periosteum of the root, and described by J. Hunter as “Common to the tooth and the socket in which it is fixed, to the one an investing, and to the other a lining membrane.” “A tooth has an in-

ternal cavity of exactly the same shape as the tooth itself, larger in the body of the tooth, and diminishing gradually in each neck to its point. This cavity is filled with blood-vessels and nerves."

Now it is obvious that the lining, inside the bottle, cannot be reached until a way is first opened into its interior by caries, or a wasting away of its substance ; for the bottle in this case is made of bone, which, unfortunately like anything merely artificial placed in similar circumstances, is subject to decay in the warm, moist atmosphere of the mouth. For a detailed account of the manner in which teeth decay, the reader is referred to the chapter on Decayed Teeth. The opening into the interior of a tooth is effected very slowly in most persons, but very rapidly in others, ranging from weeks or months to years in different cases, but always attended with equal pain at every stage of its progress when an exciting cause happens to be present ; the disease however meanwhile advancing constantly, with every fresh attack of pain to the incurable or chronic state, unless its cause be discovered and removed. The tooth is either decaying, or the

lining of its interior is wasting away with disease, or, worse than all, its periosteum is thickening and becoming fungous and incurable.

Each of the thousand and one remedies offered to the public for the cure of toothache will afford relief in some of its stages, and refuse to do so in others ; hence the uncertainty, and disrepute into which they all fall by turns ; and yet were advantage taken of the relief at any time obtained, and the disease checked by renewed cleanliness, filing, or stopping, as the case might require, many of the despised remedies would prove valuable. Instead of this, however, the sufferer generally believes that the nerves are actually exposed, or that the membranes have fallen into a state of chronic inflammation from the moment they become subject to pain ; he places little faith in remedies ; and erroneously believes that teeth once attacked by disease are past all hope, and so abandons them to their fate without any further effort to save them.

Others, who happen to think differently, would willingly preserve them if they knew how ; and yet perhaps, could not bear the unavoidable pain of special brushing, picking, filing, or stopping in certain states of the teeth.

Inflammation in any of the membranes is easily reduced, at early stages, by keeping warm water in the mouth to disperse it, or a bread poultice, say the crust, hot and moist, laid upon the gum at the part; failing these, a leech to take blood from the part as near the root as possible; failing all which a gum-boil, or extraction, or superhuman patience alone can afford relief. All, however, may be powerfully aided by cooling medicines. The membranes are easily prevented from becoming incurably diseased.

As pain and tenderness proceed from caries more frequently than other causes, it was desirable to find something which should render bone insensible to the touch, or at least as much so as in healthy teeth. With this view, about the year 1826, the author successfully applied a paste composed of Canada balsam and slaked lime, which he called anodyne cement (the first time these terms were ever employed together), from its soothing effects on tender and decayed teeth. The true anodyne cement (the term has since been erroneously applied to metals for filling teeth) is placed like a pill in a soft state to a hollow, aching, or tender tooth, and has the effect

of affording immediate relief in all but chronic cases of inflammation ; and if fresh pills be inserted as often as the old ones wear out, or are removed on the return of pain, in order, like an abscess, to allow the escape of matter or blood, and this practice be continued, the tooth will become as insensible to touch as the soundest, and may then be permanently stopped, and otherwise treated in the usual way, and without the infliction of pain. Dr. Castle, of New York, has since offered the following as a never failing remedy in chronic cases, or such as will not bear filling, which there can be no harm in trying :—

“R. Ox. arsen. alb. ; one-twentieth of a grain ; pulv. gall., one quarter of a grain ; opii two grains ; made into a paste, and applied into the cavity of the tooth, and kept there, either with wax, or lint, and creosote. One application sufficient. For two or three days afterwards apply a little dry sulphate of lime, introduced to the tooth to absorb the corruption there.”

In conducting the cure of teeth, it must be always kept in view that decay commences at the surface, like rust, eating its way inwards to the seat of the nerves ; but as many persons doubt

this, it may be as well to support this opinion with the excellent authority of Mr. Fox, who observes, that "Decay always proceeds inwards in the direction of the natural internal cavity of the tooth ; and when the cavity is exposed, the membrane which lines it, and on which the nerves and blood-vessels ramify, most commonly becomes inflamed, and produces pain." On the cessation of pain in such a case, Dr. Castle's plan might be tried by parties too impatient to go on any longer with the anodyne cement.

If the membranes which line the interior of the teeth and their sockets are gradually passing into thickened or chronic state of inflammation, which is sure to be the case when stoppings disagree, the anodyne may even then be employed with benefit, if constantly removed on the approach of pain, and every other available means for reducing inflammation be tried in addition. When disease exists, whether it be accessible or not, the affected part is predisposed to pain, which is easily excited, according to Mr. T. Bell, under the following circumstances.

"At times, in irritable constitutions, a slight cold, the excitement of mercurial medicines, in-

digestion, or some other cause, will occasion a less or greater degree of irritation in the socket, followed in some cases by abscess of the alveolus, caries of the bone, or the formation of tumours of various character; in others, attended with very painful sympathetic affections, very nearly resembling *tic-douloureux*."

With respect to tumours, which are by no means common, Hunter advises the dentist not to meddle with them, lest he should get beyond his depth, but to hand them over to the surgeon. He encouragingly observes, however, that "Tumours are in general easily extracted with a knife, unless they assume so much of a cancerous appearance as to deter the surgeon from operating. Actual cautery sometimes is necessary to stop the bleeding."

This may be the fitting place to refer to another invention of the author, described elsewhere in the chapter on decayed teeth, as well for stopping hæmorrhage consequent on extraction, as to serve the purposes of a temporary stopping for teeth, intermediate between the anodyne cement which hardens aching and sensitive teeth, and the permanent metallic fillings, viz., mastic or white

spirit varnish, applied on pellets of cotton-wool, which, although the best of temporary fillings, can always be removed on the approach of toothache, or renewed at pleasure, until a perfect cure is effected.

For the satisfaction of persons who may prefer more complicated modes of practice than the above, it may not be out of place briefly to describe some of them here. The prince of anatomists, in his experiments on the teeth, forgetting in some few instances the valuable advice he himself had given to the dentists in recommending them not to get beyond their depth in dealing with surgical cases, fell into the snare with respect to the teeth, and recommended that aching teeth should be extracted, boiled, and replaced when they would refix. Now the truth is, that teeth deprived of blood-vessels would be no better than pieces of any other ivory, and being foreign bodies, would be soon ejected from the jaw by the absorption of the socket. This practice proved a failure as a matter of course. He found, too, that newly extracted teeth would take root and live in a cock's comb ; and, accordingly, he recommended the transplanting of teeth

from one mouth to another. This practice succeeded to a certain extent, but was very properly abandoned at last, for living teeth were sometimes found to convey constitutional or other diseases to the parties receiving them.

In the present day, some London practitioners pick out the nerves and membranes of hollow teeth with sharp instruments, inflicting much pain, and requiring many visits, and then healing up the internal wounds like other fistulous openings. The wonder is, not that operators could be found, but that delicate and timid patients would submit to such torture. To burn the surfaces of the nerves with hot wires, for it is quite impossible so to eradicate them, is not an uncommon practice.

An operation yet remains to be tried which might be of value in the case of otherwise incurable inflammation of the periosteum, and that is, to pierce the gum and drill a hole through the bony socket directly opposite the seat of the disease, and so anticipate a gum-boil. This has already been done, but in a different manner, by probing down the side of the tooth to the bottom of its socket, the seat of the disease, but with

what success the author is not prepared to say.

Inflammation may exist and the thickening of the periosteum may be going on for a great length of time without the slightest external sign of their existence. Mr. Hunter's account of gum-boil, with advice as to its treatment, has not been excelled after the lapse of a century. "Inflammation extending beyond the cavity of the tooth, produces suppuration in the jaw at the bottom of its socket, which it destroys, forming there a small abscess, commonly called a gum-boil ; through which the matter, as in all other abscesses, makes its way outwards. When the abscess has opened through the gum, the best method that can be tried to prevent future gatherings, is to prevent the closing up of the abscess, till its internal surface is skinned over, or till the disposition to close up ceases. This is done by filling the cavity with lint, frequently dipped in lime water, or a solution of lunar caustic."

Creosote is now very generally employed in affording relief to cases of inflammatory toothache, and with considerable success as to the

removal of pain, which can only be temporary, unless advantage be taken of the lull, and the tooth secured against future attacks. The sharp penetrating smoke of herbs is likewise sometimes employed to afford relief, but without the prospect of permanency, and therefore not worth the trouble of describing it further. Nor can the following long approved remedies be considered as possessing more value. Sulphuric, nitric, and muriatic acids, lunar caustic, and cauterising alkalies ; burning the ear with a hot wire, as if that could reach the periosteum of the tooth ! bark, spirit of lavender, and other stimulating medicines snuffed up the nose ; hot brandy, spices, essential oils, laudanum, blisters behind the ears, and at the nape of the neck, *to divert the pain*, but, alas, not to reduce inflammation in the chronic thickenings of the membranes of the teeth, or to stop caries of the bone. The following useful general rules are suggested by modern practitioners :—for the earlier, or merely inflammatory stages of toothache in the socket of a tooth, fomentations, poultices, blisters, and leeching ; for the feverish stages, bleeding and purgations ; for ulceration, chloride of lime for

destroying virus ; afterwards tincture of aloes for healing the wound.

In conclusion, it is respectfully recommended to medical practitioners—since they are often necessarily consulted on the subject—to make themselves as well acquainted with the diseases of the teeth and their remedies—which are almost invariably independent of medicines—as they are with those of dentition and other complaints, leaving stoppings and the other final operations to the dentists, as usual. In which case, from their ever available and ready assistance they could often afford immediate relief from intense suffering in cases where now they are obliged to look on as mere idle spectators, to advise uncertain remedies, or to recommend the hateful and often unnecessary one of extraction.

It has, perhaps, been unfortunate that toothache can be so easily got rid of by extraction, since that, perhaps, may be the cause of the small progress hitherto made in effecting its cure, or effectually guarding against its approach. It ought not, however, to be lost sight of, that on the teeth depends much of one's health and comfort through life, as well as personal appearance

and the power of speech ; besides, that many timid persons go on suffering till all their teeth are lost through disease rather than submit to extraction, or indeed to any of the operations required for preventing decay. It may be truly asserted, that more than three-fourths of the teeth now extracted in consequence of toothache might easily be preserved by extending the knowledge of the best methods of effecting cures, and of cleaning, filing, and stopping, operations which can be performed with comparatively little pain. Were it not for toothache, many persons, indifferent to wrinkles, hollow cheeks, and false teeth, only however while looming in the distance, would often permit teeth to decay, which now they are compelled to preserve ; so that viewing the subject from a philosophical point of view, we may look upon toothache, suggestive, though it be, of sleepless nights and cruel extractions, as a sort of guardian angel in disguise, sent not to afflict, but to warn us, the true mission of the nerves, of approaching danger from an insidious and merciless enemy.

## SALIVA.

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SALIVA, the natural fluid of the mouth, is secreted by six salivary glands, one of which, on either side of the mouth, empties itself near the second large molar of the upper jaw, the other four discharge their contents through numerous minute orifices below and near the front of the tongue. While it has important duties to perform with reference to the teeth, as is here intended to be shown, the saliva, it may not be out of place to observe in passing, usually affords the readiest clue to a knowledge of the true state of the general health. We know that, by its indications on the tongue, medical science is guided as by a species of barometer in its course of treatment. Saliva not only moistens the mouth and throat, but mixes with the food during mastication to

facilitate swallowing, and is so necessary for healthy digestion, that it cannot be dispensed with without injury to the constitution. In a healthy state of the body, the flow is abundant and constant, as is sufficiently obvious by the necessary act of swallowing frequently, while in febrile disorders the supply is scanty and vitiated ; so that, as a consequence, the mouth and tongue become dry and parched, accompanied by the loss of appetite. An abundant flow of healthy saliva, together with the polishing action of the food, lips, and tongue, tend to clean and preserve the teeth, while, on the contrary, a scanty supply, viscid, adhesive, and stagnant, as it must necessarily become in the fur which it deposits, and in the relics of food which are carelessly left to ferment and rot about them, breeds disease, and is the most common cause of caries and offensive breath. To the inveterate smoker and chewer of tobacco, let it be here stated for the satisfaction of those ladies who desire to abolish the practice, no alternative is left but either to spit out or swallow vitiated saliva, and both methods are equally detrimental to healthy digestion.

During mastication and speaking, the quantity of saliva is greatly augmented from mechanical pressure upon the salivary glands, and as has been computed, may in some persons amount to near a pound in weight at a single meal. This will not appear an extravagant estimate to persons accustomed to witness operations on the teeth, which, like mastication and speaking, excite the salivary glands. Pure saliva is limpid, with perhaps a faint tinge of blue colour, and although, from the nature of its composition it must be slightly viscous, it is free from the characteristic ropiness which distinguishes acid saliva; and whereas unhealthy saliva is sensibly sickly and offensive, it possesses in its pure state a scarcely appreciable amount of either taste or smell. Saliva is in reality a mineral water from which salts of various kinds are separable by chemical resolution, and having, according to some authors, in a healthy state of the body, about four-fifths of its bulk pure, the remaining fifth being made up of mucilage, albumen, and saline substances.

According to Mr. Bower, "Saliva is composed of a peculiar animal principle; various salts of

potash, of which the chloride of potassium and the sulphocyanide are the most numerous; of mucus and some salts of soda, it contains about one per cent. of solid matter only."

Many persons erroneously believe that food cannot be swallowed without some other liquid to mix with the saliva during mastication; in consequence of which, and the undesirable repose of the salivary glands, the supply becomes scanty, and disposed to dryness, as in febrile complaints, when among other injuries it forms a viscid mucus on the tongue and teeth, which, unless it be frequently removed by rinsing and brushing, becomes tartar, the injurious effects of which cannot be too much dreaded.

Let such persons be induced to try the experiment of chewing dry food long and leisurely, when, to the great advantage of their teeth at least the saliva will be found to flow naturally, and in sufficient quantity, to enable one to swallow with ease and comfort.

Partly from some property in itself, and greatly from its situation in the mouth, where all the conditions required for active chemical change, as warmth, air, and moisture are ever present, the

saliva is nearly as assimilative as the gastric juice itself; and, as the latter is known to dissolve bone, so the former, when long retained about the teeth in the spongy relics of food which are habitually permitted to remain at those parts of them which lie more out of the reach of friction during mastication, dissolves the bone of teeth, and the result is called decay, or caries, which, after all, is nothing more than the simple softening of the bone. The softening thus produced can easily be checked at any stage, by resolutely cleaning and polishing the part to its bottom every day, although when the nerve, bottled up as it is within a tooth, comes to be actually exposed, of which, however, mere pain affords no proof, it will be difficult to bear with such treatment. Caries is thus easily checked, because it invariably commences at the surface of the bone, in the structural lines and cracks of double teeth, which form a species of open drains, and at the necks of, and in the intervals between all teeth whatever, in persons who are indifferent to such matters, and who permit moisture, and particles of food to become old and rotten in such receptacles.

Caries not only commences at the surface, but in the same spots of corresponding teeth, whether they be real or false in all mankind ; and those spots will as invariably be found to be out of the reach of friction during mastication. Any stagnant moisture will soften bone ; a toothbrush in constant use will soon become carious and offensive in the lines where the bristles are fixed when kept under cover ; but, it requires the presence of acid in the saliva to dissolve enamel, which, unlike decayed bone, which passes through every stage of decomposition, it only reduces to a white chalky powder, in which form it is usually called white decay. Now, all decay of teeth is white when rapid, simply for want of time to turn black, or at least dark and ugly, as everything is sure to do which is retained for a long time in the mouth.

In this way old tartar is dark, while the deposits of a single year are whitish. In a mouth where the teeth are very subject to decay, the saliva will, in general, be found to contain acid ; and, strange to say, this state of it, or something analogous, is often hereditary, and may be traced in families for generations. Acid saliva, like sour fruit, renders teeth white and brilliant for a time,

but at the expense of the enamel, as in the grape cure for example, which it partially destroys. It is, however, consoling to know, that with unwearying pains in cleaning, its ill effects can be completely counteracted even in teeth unavoidably subject to white decay, and that caries never gains a footing, but at spots, where a cunningly searching toothpick could at any moment find relics of food that had been passed over by the tooth-brush.

Acidity in the saliva is known by its ropey, adhesive, and cobweb-like appearance, which is destroyed for the time, when well mixed with alkalies in cleaning the teeth and rinsing the mouth. Medical science may probably one day discover a constitutional and permanent remedy for acid saliva, without detriment to the general system, while it must tend greatly to preserve the teeth.

That saliva is a great cause of the decay of teeth, is further proved by its acting in the same manner, and with exactly the same results on any ivory as on natural teeth. Teeth transferred from a living mouth not subject to decay, to one that is, soon decay like their pre-

decessors, and the same rule holds good when the case is reversed. If the false tooth be made of solid ivory, a tooth is not a solid body, it will decay at the same spot where the disease commenced in its predecessor, and gradually become quite hollow, leaving the general surface, that had been exposed to friction, not only sound to the last, but harder than before, a mere shell, that only breaks down in the long run with use, for want of internal support, like living teeth placed in similar circumstances.

## TARTAR OR FUR

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THE salivary calculus or earthy concretion found upon the teeth is called tartar, and may be regarded as a type of the fluid from which it has been deposited.

With the exception of caries, nothing is so destructive to the healthy condition of the mouth and the duration of the teeth as tartar, or more offensive to the sight and smell, while it cannot but prove equally injurious to health as other bad odours. Tartar, being a foreign body, displaces and inflames the gums, and thereby causes their separation from the teeth, an effect further and invariably attended by absorption of the bony sockets in which the teeth are fixed, when, as a matter of course, they become loose and drop out. While the salts, and other mate-

rials held in solution in the saliva, of which they form an important component part, and of which tartar is composed, are yet in a soft, viscous, and adhesive state, their natural condition when first precipitated, or when the saliva is dried up with fever ; the deposition is commonly called fur, and fur, as most persons know, collects upon the tongue and other parts of the mouth, as well as on the teeth. In this state, however, it is to a certain extent unavoidably and fortunately wiped away daily as with a brush, by the tongue, lips, and food, from every part naturally subject to their action during mastication, and would obviously admit of easy removal from the more intricate and less accessible localities by the judicious use of toothbrushes, toothpicks, and successful rinsing. We find that the prominences of teeth, like those parts of machinery in constant use which come in contact with others, are in a high state of polish, cleanliness, and preservation, while the lines or seeming cracks, natural to their surfaces, and inaccessible to touch, owing to their depth and narrowness, are always foul and disposed to decay, being filled with decomposed food and saliva, which soften the bone, and

render it carious ; suggesting the idea, but erroneously, of internal and unaecountable disease. The interstices between the teeth, which unfortunately go on increasing in size as the gums recede, are constantly being filled up with new deposits of fur, which in due time harden to tartar. In this way a very dilapidated mouth is sometimes artificially made up, as with false gums and loose teeth ; and, tartar, which continues to harden still more the longer it remains, only does its destructive work more completely ; while, to the inexperienced in such matters, it often appears unnatural and uncalled for to break up and remove it. Tartar has even been mistaken for an emanation from the dental system itself, as a substitute sent by nature, in old age, to supply the places of the lost sockets, as if old age, and not the habits of life had anything to do in the matter. The gums, and, as a necessary consequence, the sockets of the teeth of savages remain well up on the teeth to extreme age, while those same teeth are often worn down with actual use to the very gums, a condition unattended with any ill consequences. The teeth and gums are well adapted for labour, and require a great

deal of exercise to keep them in health ; without which they decline and become sickly,—the teeth falling out gradually in consequence of the inroads of tartar, which destroys their sockets,—and the gums sinking again in old age to the original jaw-bones, as they were formerly in early infancy, when without teeth.

The cutting and grinding edges of healthy teeth are always clean with use, and look highly polished, while their general surfaces towards the gums may be black, with all sorts of impurities, but more especially tartar. Horizontal lines running along both rows, like tidal marks, separating the foul from the clean, are often to be met with in careless keeping ; above which lines, or between them and the tips of the teeth (small thanks to the possessors), no tartar can ever form, owing to the daily polishing they receive from mastication ; but, below the lines, towards the gums, there is no limit to its increase, except the actual jaw-bones and the absence of teeth, which, in such case, the tartar is sure to have hugged to death.

The sockets in which the teeth are fixed are added gradually to the original jaw bones to support the teeth ; they melt away readily like

some softer material under the influence of salivation in excess, or of gums that are unhealthy from any cause, and there is no cause so general as tartar, the greatest enemy of green old age.

Newly formed tartar retains liquids like chalk, and stagnant saliva, under the decomposing influence of the warm moist atmosphere of the mouth, soon becomes rotten, and occasions offensive breath, alike unpleasant and unhealthy; and dark old tartar buried under spongy scorbutic looking gums, and the habitually retained relics of decaying food, soften the bone, which softening is in reality the natural history of caries in teeth, and foul tartar is said not unfrequently to teem with microscopic life. *///*

Tartar consists principally of carbonate of lime, animal, and other matters, the relative proportions of which, however, differ so much in different persons, and in the same persons at different times, that any two analyses rarely furnish the same results, as may be seen from the three following accurate analyses furnished to the "Lancet" by Dr. Wright.

|                                                                                     | 1st.       | 2nd.       | 3rd.       |
|-------------------------------------------------------------------------------------|------------|------------|------------|
| Carbonate of lime - - - -                                                           | 81.3       | 79.4       | 80.7       |
| Phosphate of lime - - - -                                                           | 4.1        | 5.0        | 4.2        |
| Muriates, hydrosulphocyanates, laetites, potash<br>and soda, and carbonates - - - } | 6.2        | 4.8        | 5.1        |
| Animal matter, consisting of ptyaline, albumen,<br>and mucus - - - - }              | 7.1        | 9.5        | 8.3        |
| Loss in experiments - - - -                                                         | 1.3        | 2.3        | 1.7        |
|                                                                                     | <hr/> 100. | <hr/> 100. | <hr/> 100. |

There are comparatively few persons in civilised life whose teeth remain permanently free from tartar, and many, from constitutional causes that appear to be harmless in other respects, are much more subject to it than others. Even in animals, when confined in menageries, or pampered as pets, and having no longer the same occasion or opportunity of exercising them as formerly, the teeth become rusty and loaded with tartar, and with the same results as in the analogous case of human beings. In accounting for the existence of tartar, it may be observed that the animal fluids, when out of the course of general circulation, are apt to stagnate and deposit sedimentary matter; that although during health the flow of saliva is sufficiently copious to carry off in the food its more solid contents as swollen streams scour their beds, yet.

on the other hand, when vitiated by disease, its supply becomes scanty, sluggish, and viscous, and forms an inspissated mucus, not on the teeth alone, as already observed, but on the tongue and other parts of the mouth. With a barnacle-like grip it fixes on the more rigid surfaces of the teeth, and remains on those parts of them only which happen to be placed out of the reach of friction during use, till it becomes tartar. Fur settles down in thin layers, like tidal deposits, filling up the breaches itself has made, and increases in every direction as far as mastication will permit it to collect until it assumes the form of the original gums, when alone it ceases. Tartar does not always look black and ugly, especially at the edges where it is wiped and polished along with the teeth, but is, on that very account, all the more deceiving, since, with filthy folds, and like a snake in the grass, it surrounds the teeth and uproots them.

In the absence of tartar, and with sufficient natural employment, either the teeth are clean, polished, and dry looking, or they ought to be made so by artificial means; the gums, in like circumstances, are thin, and almost incapable of bleed-

ing on being pricked ; and, when otherwise they ought to be bled freely with a toothbrush repeatedly every day, until they become so, in spite of antiquated notions, and doubtful misgivings to the contrary, come from what quarter soever they may. Sickly gums over and about a broken down tooth or root ought to be rendered thin, sweet, and healthy by prickly brushing and unrelenting bleeding, assisted by a few drops of any of the usual tinctures or lotions in the water, or on the wet toothbrush in finishing the operation.

## THE GUMS.

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THE skin that covers the edges of the jaw bones, through which the teeth have to pass, and in which they remain sticking midway for the remainder of life, is called the gums. The gums possess the power of adapting themselves, with comparatively little interruption to their general health, to changes of condition which the skin of other parts cannot endure with similar impunity. Before the commencement of dentition they present a beautiful and unbroken surface, in common with the rest of the mouth, already apparently complete without teeth, and seemingly not intended to undergo further change; during its continuance, however, the gums frequently become tumefied and inflamed, and they find relief from pain at last, only when rudely

pierced by each successive tooth as it rises into view, or by the more speedy operation of the lancet. The orifices thus made, of which there are thirty-two in all, remain as long as the teeth exist to keep them open; but, when the teeth from any cause are lost their firm bony sockets melt away; and then, the gums, happy to be released from the thralldom in which they were held by foreign bodies shrink back to their original place on the naked jaw-bones, and become again in old age what they formerly were in earliest infancy, the thin unbroken healthy looking skin of the mouth. Let not this picture, however, tempt any one heedlessly to sacrifice teeth, for there is a painful difference between the shortened face of old age, with its natural accompaniment, projecting chin, and the sweet rotundity of infancy.

The teeth and gums appear to live in a state of perpetual antagonism, which nothing but severe labour can subdue. Whenever the former are indulged with ease and luxurious living, they gather parasites in the shape of tartar, relics of food, and caries, all which are mightily injurious to the latter. The gums are fond of the cleanliness

which fair-play mastication usually ensures to them, or, in its absence, the successful use of a toothbrush, and when the teeth, which they so closely embrace, are also clean, they get on well together, and look charming ; but when the teeth are carelessly managed, and allowed to be habitually dirty, the gums swell, look red and spongy, and bleed freely when touched (which by-the-bye is the best way of curing them), and not only forsake the teeth, but dissolve the sockets in which they are fixed, and in that way expel them altogether at last.

The connexion of the teeth with their sockets and gums, apparently the most artificial arrangement of the bodily system, subjects them, without any constitutional weakness of their own, to frequent and painful attacks of inflammation, not only during the period of dentition, but afterwards from carious teeth, accumulations of tartar, and absorption of the sockets, and that too without the most distant chance of natural relief, so long as the offending teeth, or other exciting causes, which are always easily discernible, are permitted to remain. Partly, as it would appear, from structural formation, and

greatly from the cleansing influence of mastication, diseased gums heal up more readily than other skin, and, after the loss of the entire set of teeth, they acquire a sort of cartilaginous hardness, which enables them to do tolerable duty for the absent teeth. The system of the teeth, with which the gums are so intimately connected, is superadded to a bodily framework that might be considered as already complete and finished without them, as in infancy, but for the change of food afterwards required on quitting the nurse—a corn mill to supersede the dairy. Other members of the body, as the hands, &c., though equally entire and useful in the infant as in the adult, only smaller and weaker for a time, possess the power of growing large together, without falling out of symmetrical proportion, or causing uneasiness during their transition state; while the teeth, on the other hand, after a fashion of their own, are imperfect, broken, and fragmentary, and consequently useless till complete. Teeth never make their appearance until they are already full grown, and incapable of further change, and even then they advance in a slow, tedious, and painful manner, just when their roots, the last

parts of teeth that are formed, are added, in order to push them on and fix them in the jaws.

While the loss of teeth, like that of the hair, can only be regarded as disfigurement to a comparatively small extent, that of any other part would be considered as absolute mutilation.

In accounting for the annoyances so constantly attending them at every stage of life, the gums may be considered in the light of neutral ground placed on an otherwise perfect bodily system, and intended to be broken and healed up at pleasure, for the benefit of the characteristically fickle teeth, and their sockets, which, after all, are little better than excrescences or foreign bodies, whose services, important and valuable though they be, are often purchased at a dear rate. It is unnecessary here to repeat instructions already given in another chapter, for preserving and restoring the health of gums, as they are identical with those required for preserving the teeth ; but as many persons, injuriously to themselves, are apt to confound unhealthy gums in general with special cases, including gum-boils, it may be advisable to explain the difference.

A gum-boil is generally confined to one spot opposite the root of a diseased tooth, and is therefore usually preceded by toothache. It originates in inflammation of the membrane within a hollow tooth, or of that which lines its socket. In either case the inflamed vessels have no room to expand as in soft parts of the body, hence the too well known excruciating pain attending the formation of gum-boil; and when pus is formed, it can find no exit until it has eaten its way through the solid bony socket, and inflamed the gum outside, raising it to a boil, which, if not anticipated by the lancet, in due time breaks of its own accord, and relieves the pain, when the gum again resumes its former appearance, with perhaps, in cases of long standing, a small fistulous opening, called an abscess, left in it as a safety valve against similar severe explosions for the future. Diseased gums, as generally understood, apply to every part of them, except at those more fortunate spots which have the benefit of friction during mastication, or the successful and systematic application of a penetrating toothbrush. Healthy gums are thin, or at all events possessed

of one uniform thickness and colour throughout, and they never bleed when touched. It may be comforting to know that diseased gums can in most cases be easily restored to health by a rigorous system of cleanliness, and that gum-boils, unless checked by fomentations, poultices, or local bleeding, will relieve themselves at last, though tediously and painfully, by bursting, and so permitting a bag of matter to escape.

## SOCKETS OF THE TEETH.

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THE holes underneath the gums in which the roots of teeth are fixed in the jaws, are called alveoli, or sockets. The socket of a tooth is a tubular plate, or raised well, added gradually to the original jaw-bone, to support the tooth; and, when a tooth by any chance is lost, its socket melts away; and, although composed of bone as hard and permanent as the rest, the socket disappears as completely as if it had never existed, leaving the gum to fall back into its original situation on the jaw-bone. The alveolar processes, or system of the sockets, add about an inch and a half to the length of the face, the loss of which on disappearing with the teeth, produces those other characteristics of old age,

wrinkles and projecting chin. We have the authority of the celebrated anatomist, John Hunter, for stating that the "alveolar processes of both jaws should rather be considered as belonging to the teeth, than as parts of the jaws; for they begin to be formed with the teeth, keep pace with them in their growth and decay, and entirely disappear when the teeth fall; so that, if we had no teeth, it is likely we should not only have no sockets, but not even those processes in which the sockets are formed; and the jaws can perform their motions, and give origin to the muscles, without either the teeth or alveolar processes; in short, there is such mutual dependence of the teeth and alveolar processes on each other, that the destruction of the one seems to be always attended with that of the other."

Of the various diseases to which the mouth is subject, that of wasting sockets, if not so painful as some others, is certainly not the least vexatious, since, without them, the teeth become loose and useless. As, however, the process of absorption is slow, and the sockets naturally placed out of sight, this disease often makes

great progress before it is discovered ; and then, at length, when perhaps too late to be of much use, for the sockets, like the teeth themselves, possess no reparatory power, and can, therefore, never be renewed ; although, fortunately, while any part of them remains, their further absorption can be checked by skilful brushing and scari-fying, a fact deserving attention since shaky teeth, and even broken-down roots, are often, by such simple means, rendered useful and permanent, and, in many instances, superior in point of comfort at least, to artificial substitutes, which at the best, are but timber legs after all. Whenever the gums are swollen, apparently scorbutic, and given to bleeding, absorption of the sockets ought to be suspected, for then, sure enough, it is taking place ; but when the necks and roots of teeth begin to show themselves, there surely can be no longer any doubt on the subject.

It must not be overlooked, too, that swollen and spongy gums often conceal the roots of teeth that have been deprived of their sockets, until such gums are restored to health, and, consequently, reduced in size, when the roots come in

sight, not injured as some suppose, by the necessary treatment, but greatly improved by the exhibition of their true state because it is calculated to awaken attention to them. Those who look to denuded roots alone for the discovery of decaying sockets are often deceived, and those who think that the removal of tartar, the sole cause of the evil, is needlessly to make holes in the jaws are wilfully blind to their own interests, for the holes, as they call them, already exist, being spaces between the teeth, and are increasing, nor is there any other method, except successful brushing from the commencement, by which they can be prevented. Bleeding gums are as bad in their own place, as bleeding lungs. It cannot, therefore, be too extensively known, that the gums are easily restored to health at any time by merely bleeding them freely every day with a small, hard, penetrating toothbrush, applied like a toothpick, and without having recourse to the cruel system of paring them with scissors, when they will soon become thin and healthy, and sink into their place on the yet remaining sockets; that the remaining portions of the sockets are

preserved from further absorption by restoring and preserving the health of the gums ; and that shaky teeth and roots may be usefully retained while any portion of their sockets remains in health.

## CLEANING THE TEETH.

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IT is admitted, pretty generally, that to clean the teeth daily with absolute success at every point, will prevent decay, but it does not appear to be so familiarly received that the processes required to do so, will also prevent tartar, spongy gums, and loss of sockets—the ordinary cause of loose teeth ; nor that loose teeth, and even roots, while never so small a portion of their sockets remains, can be rendered comparatively firm and retained with advantage, as long as they do not occasion pain. There is no subject of common daily practice less understood than that of cleaning the teeth, nor one that is generally performed with so small success, without instruction, even by persons of the nicest tastes and habits in other respects.

What is here meant by cleaning, is to remove with a toothbrush and water, the relics of food that remain about the teeth after meals, and the fur which usually settles on them when at rest.

Fur, the solid part of the saliva, is found upon the tongue, and other parts of the mouth as well as on the teeth, and as it is soft when first deposited, it is almost invariably rubbed away in the course of the day from every part subject to friction during mastication, and ought to be picked out of the more intricate localities of the teeth by the ingenious application of a small, hard, penetrating toothbrush, employed as a toothpick. When permitted to remain, the fur soon hardens to tartar, and then steel instruments and practised skill are required to remove it. Tartar on the teeth resembles the crust formed on steam boilers, and its removal has been called scaling, a term, which though sufficiently expressive of the operation, is considered harsh by many, and apt to deter them from submitting to its removal, however necessary. In order, if possible, to remove this prejudice, considered by dentists as injurious only to its possessor, as well as another still more extraor-

dinary, not yet quite extinct, viz., that tartar is an emanation from the teeth themselves, intended by nature to supply the place of the lost sockets in old age,—the opinion of the celebrated John Hunter on the same subject, is here added:—“Scaling, that is, cleaning them of the stony concretions which frequently collect about the necks of the teeth, is proper and useful ;” and he might with truth have added, that when left undone, the teeth inevitably loosen and drop out prematurely. The following sensible remarks are from quite a different source, the *Court Journal*:—“How often do we find the human face divine disfigured by neglecting the chiefest of its ornaments, and the breath made disagreeable to companions by non-attention to the teeth. Though perfect in their structure and composition, to keep them in a pure and healthy state requires some little trouble, and if those who are blessed with well-formed teeth knew how soon decay steals into the mouth, making unsightly what otherwise are delightful to admire, and designating unhealthiness by the impurity of the breath, they would spare no *pains* to chase away those fatal blemishes.”

The relics of food are cleaned out, and sputtering saliva is made to flow healthily in some mouths more than in others, by the natural action of mastication, or by vivacious movements of the lips—more wanted than graceful—afterwards. When, however, permitted to remain about the teeth, they invariably rot in the warm moist atmosphere of the mouth, and not only taint the breath and render it unpleasant to others, but become prejudicial to health. And as the teeth are composed of materials equally liable to decomposition as food itself similarly placed, it corrupts the bone at the part on which it usually settles, and makes it carious, when, as a matter of course, the nerves become exposed and liable to common toothache. It is a fortunate circumstance that caries, the prevention of which appears to be, though not wisely, the sole aim of many who otherwise pay great attention to their teeth, invariably commences at the surface of the bone, where, as a matter of course, it is more easily reached with a toothbrush, and other appliances; and that, like rust on steel, it is easily prevented by a determined system of

cleaning and polishing. The analogy between them may even be carried further, for caries in teeth, when permitted to go on unrestrained by mechanical agency, will, like rust, eat up entirely the object of its attack. It will scarcely be credited at the present day, that caries, the mere softening of the bone of teeth from exposure, more than that of any other part of the body, to the constant and rapid vicissitudes of heat and cold, moisture and dryness, could be considered amenable to internal influences or medical treatment. If any persons entertaining such opinions, however, still remain, they will find themselves miserably disappointed in the long run, and lose teeth which can easily be preserved by the ordinary treatment of the day.

Machinery in frequent motion is always clean at every part subject to friction, and so it is with the teeth, and if the centres of the molar teeth, often found in a diseased state, although the very parts most exposed to friction during mastication, should appear to form an exception from this rule, or to be a complete upsetting of the theory here adduced, the reader is requested, for

his own sake, fairly to investigate the case, and which, fortunately, admits of easy solution.

The centres of the molar teeth have lines or cracks incident to their original structure (from which a piston-rod, for example, is free), which are deeper and narrower in some persons than in others, and in which, consequently, the same moisture lies rotting, being inaccessible to the toothbrush or rolling food, till it softens the bone at the part and beyond it, underneath the working shell, which at last breaks down to the stump; in which state even then, when kept studiously clean, such root will last long, and prove as serviceable as many a better tooth. These are the lines usually filled in and levelled with metallic stoppings, which, when well executed and kept clean, are known to last for the remainder of life.

If we may judge by the careless manner in which many persons brush their teeth, we must arrive at the conclusion, either that they are ignorant of the consequences, to which no thinking person ought to be indifferent; or that in their estimation, it signifies little how the operation is performed, so it be performed at all, and

with tolerable regularity; and yet, in order to preserve the teeth from decay, or what is equally bad, from dropping out, in a sound state, the process of cleaning must be regular and complete. There can be no safe middle course, except for those rare and fortunate cases where the teeth, from constitutional causes, appear to bid defiance to decay. Let not the possessors of such, however, rely on exemption from those other diseases to which all teeth are liable, and more especially those which originate primarily in accumulations of tartar.

It is not enough for safety to make the teeth look smart in front only, by brushing them across, even to wasting their substance—a not uncommon act—while foul moisture is permitted to remain in sight between, and at their necks, lying in spongy gums, to soften and gnaw away their substance, and suggesting the idea of fine pictures set in dirty frames; while, perhaps, everywhere else they are loaded with tartar and decaying food. Since, in order to ensure success every, the minutest part of each tooth, not in the direct way of friction from food during mastication, must not only be thoroughly searched

to its utmost recesses, but effectually cleaned out and polished by brushing, picking, and rinsing, at least once every day.

- In early youth the spaces of the teeth are so well filled up with thin, firm, healthy gums, as to prevent the admittance of food between them; and in some instances from their fortunate arrangement in the jaws and the good use made of them in mastication, they remain so for life. With sufficient attention to their management, more especially the successful use of toothbrushes from the beginning, all teeth may be so, or very nearly so, preserved; nor must it be lost sight of that the difficulty of brushing increases as the gums are permitted to recede, leaving greater recesses for the lodgement of food and tartar.

Tooth-powders and lotions are for the teeth what medicines are for the body, necessary evils; bad cleaners do not succeed in applying them any more than the brush itself at the proper places, else their assistance would not be required; and good brushers rarely require them, and learn to preserve their teeth without them, or only employ them to remove actual stains which any, the best managed, teeth may sometimes pick

up, in use. To say that it is a very easy matter to clean teeth well, or that children, great or small, can be expected to do so without a good deal of instruction, is simply absurd, and always ends in failure. In order to be successful in cleaning the teeth, their shapes, must be considered, which not only differ from one another in respect to the classes into which they are divided, but continue to differ from what they formerly were, as the gums recede, or as some of their numbers drop out ; and the shape of each must be cleaned separately, with a picking sort of touch, all round it, searching underneath the edge of the gum for everything moist and dirty, and capable of being removed. A very little study of the case will soon render tooth-brushing easy, rapid, and successful. There is a knack in brushing which can be taught to persons not sufficiently mechanical by nature to discover it for themselves. Nor ought the time and pains bestowed upon the teeth, organs so ornamental and conspicuous, and so absolutely necessary to health and speech, be considered as thrown away.

Some persons are apt to despond because they do not succeed in preserving their teeth by much

cleaning, so well as others who habitually neglect theirs, and yet experience no inconvenience in consequence, and they begin to entertain doubts about the value of a practice which their reason and tastes so greatly approve; or, at least, that theirs is a peculiar and unfortunate case; forgetting the possibility of their performing the necessary operations badly, and that mere labour, however assiduously bestowed, does not always command success in mechanical arts, without instruction or a sort of natural intuition. It is quite possible, nay, quite common, to perform the operation of cleaning the teeth repeatedly every day and yet leave particles of food rotting between them, and at their necks, in all directions. It is a valuable maxim in managing the teeth, that those which are bad with cleaning, would be infinitely worse without. A few well-directed touches of the toothbrush, like happy thoughts, will often accomplish in a moment, what formerly defied a whole age of ill-directed effort. It might prove suggestive of improvement in the mode of brushing to non-mechanical minds, to call a toothbrush by the name of toothpick, and to use it accordingly.

There are persons who pride themselves on never looking in a glass when cleaning their teeth, who would shrink with horror at the idea of finishing other and less difficult parts of their toilet, in the dark ! Let them be advised to look and learn what they are about.

A useful test of success in brushing would be, after the operation to search with a fine tooth-pick between all the teeth, at their necks, and in natural indentations, for the remains of food and tartar, and never to remain satisfied while any could be found. Another good test would be the experimental use of some dark tooth-powder, particles of which would be sure to remain about the teeth, and the spongy gums of bad cleaners. Cases are not uncommon where the gums are rendered permanently dark, as if impregnated with gunpowder, with the use of dark tooth-powders, a proof of unsuccessful cleaning.

As most persons are fond of using tooth-powders and lotions occasionally, and some even require to do so, although a good toothbrush and plain water ought to be sufficient for every necessary purpose, it may not be out of place to advise the discontinuance of all tooth-powders of

which the ingredients are not made public, as they may contain acids, which are sure to dissolve the enamel. Brick-dust, well pounded, is as good a tooth-powder as any ; cuttle-fish bone, and even finely pounded pumice may be employed in moderation, with the addition of chalk, in case of acidity, or sputtering ropiness in the saliva.

Then, as to lotions, the bases of them all are alcoholic. All sorts of spirits, when mixed with water only, are equally good for the teeth and gums. The choice lotions consist of spirits of wine, with other matters, often harmless enough and sometimes pleasant, held in solution in them. Then as to toothbrushes, of which there is no end to the complaints, it must be candidly admitted, that the fault in general lies with those who use them. If the brush be much softened with water, and rubbed hard over and across the teeth, it may be rendered useless at a single sitting, and without much benefit to the teeth. If, on the contrary, it be employed with a light combing touch, after the manner of a toothpick, and carefully dried after the operation, and laid by, not under cover, but exposed to the air,

it will last a long time. A good toothbrush is scantily supplied with bristles of uneven lengths, after the manner of a penetrating hairbrush, and is of small dimensions, in order the better to reach every part of the mouth. To this form one or two other varieties might, in some cases, be added with advantage, one having the bristles set as in a toothpick, the other a cone placed at right angles at the end of the handle—what is usually called an inside brush, not large and bushy, but thin and delicate. In conclusion, it is right to add, that it is always proper to take away all the blood we can extract with a toothbrush.

“Sloth, like rust, consumes faster than labour wears, while the used key is always bright,” as poor Richard says.

## DECAYED TEETH.

### PART FIRST.

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“THE teeth are possessed of a structure that enables them to resist decomposition more than any other part of the animal body ; it is not unfrequently the case that they are the only remains of extinct animals which can be found.” And yet, during life, they are so subject to decay, that comparatively few persons attain old age in possession of a perfect set.

The teeth, then, decay, not from any inherent tendency to it in themselves, but from the situation and circumstances in which they happen to be placed ; as is sufficiently proved by the fact, that false teeth, whether composed of human or animal ivory, are equally liable to be attacked by

it, as were the lost teeth whose places they supply.

All teeth are subject to decay under certain conditions, but in some mouths much more so than in others ; and the disposition, either way, runs in families, and in such a marked manner, that when one parent has decaying teeth and the other not, some of the children have good, while others have bad teeth ; the causes of which can be distinctly traced to the shape of the teeth and the quality of the saliva.

One thing is certain, that when the indentations and seeming cracks of construction, which mark the surfaces of a certain number of the teeth, are deep and capable of irremovably retaining decomposed food and saliva, they decay more readily than those whose surfaces are smoother, and, as it were, more highly finished. Decomposition, caries, or, literally, the softening of the bone, invariably commences at the surface, which, in the case here referred to, means at the bottom of the cracks in the enamel, and eats its way inwards, in the direction of the nerves, till nothing remains except the outer shell, a mere roof, which, no longer supported from within,

breaks down suddenly under the pressure of mastication. Experience, however, teaches us, that if those cracks be filled up artificially in such a manner as effectually to exclude air and moisture, the promoters of decomposition, no such decay takes place. We further find, that the saliva of some mouths is more destructive to the teeth than that of others, having the power of readily converting to chalk the enamel of any spot where it habitually remains from day to day in the relics of food, and thereby opening a passage to the bone, which, being no longer protected as intended by nature, and in the absence of daily cleaning and polishing, becomes soft, and turns to mud, in which form it gradually oozes out into the mouth and disappears. This sudden conversion of enamel to chalk, is, for want of a more appropriate name, called the white decay, for caries in general, as well as tartar, become continuously darker with length of time.

The teeth of animals and barbarous nations rarely decay ; they are never permitted to become rusty, as they often do in civilized life, for want of sufficient use, but remain bright and sound to the last ; although, when their possessors live to

be old, they invariably wear down their teeth to the gums, a condition attended with neither pain nor other inconvenience.

The question is sometimes asked, whether the teeth are not deteriorating; but it ought not to be overlooked, that many splendid sets are daily to be met with in every condition of life; that the causes of decay are well understood, and as capable of preventive and remedial treatment as most other common diseases.

Decay in teeth, like the rot in trees, is produced by atmospheric influences, to which they alone, of all the bones, are nakedly exposed; for wherever moisture can lodge, in either natural or accidental flaws, there decay invariably takes place, unless it be counteracted by art. Hence, the care with which trees are pruned, the necessary excisions smoothed, and inequalities filled up to protect them from the weather. Hence, perhaps, the origin,—the first idea of filing and filling up the holes of decayed teeth; success in both cases depending altogether on the perfection with which the necessary operations are performed, and the care taken of them afterwards. The analogy between them may be carried even

further, for foresters and gardeners scrape off moss as dentists do tartar.

If decay had its origin within a tooth from constitutional causes, as many persons erroneously suppose, all the teeth in a mouth would suffer alike, and the external mechanical treatment, which is known to preserve a great many, would prove of no avail in any case. The time, it is to be hoped, is past, when members of the healing art could persuade themselves that caries in teeth can be checked by change of diet, any more than the falling out of the hair, without the aid of artificial or mechanical means. It must not be overlooked, that even the great John Hunter himself, a century ago, fell into mistakes with respect to the teeth, having, among other things, recommended that an aching decayed tooth should be extracted, boiled, and replaced, when it would become firm and permanent, and not ache again !

The more prominent parts of the cutting edges of single teeth, and of the grinding surfaces of the molars, whose position necessarily subjects them in a greater degree to the polishing influence of the tongue, lips, and food, during mas-

tication, are always clean and sound, while those other parts which, from their shape and position, lie out of the reach of friction, though seemingly in greater security, become diseased. They soften and decay unless the loss of natural friction be supplied by artificial means, more especially the skilful use of toothbrushes and similar appliances, which, if faultlessly employed from the beginning, never fail to preserve the teeth. In this way those parts of machinery in constant use, which act on one another, are ever bright and polished, while others are eaten up with rust ; and even in the centre of the brightest spot, if a flaw exists, the bottom of which is inaccessible to ordinary cleaning, it decays, and undermines the rest ; and so it invariably is with teeth. In this manner teeth, broken by accident or formed to particular shapes by design, and even roots, are preserved or otherwise, according to the direction of the fracture, the surface of which may or may not have the benefit of natural friction and polishing, while the sufferer, ignorant of the causes of decay, and yielding to a blind fatality as regards teeth, usually ascribes the one or other to the good or bad quality of the teeth themselves,

which, in all probability, has nothing to do with the case.

There ought to be no hesitation or delay in treating decaying, or even suspected teeth according to the best known rules, for unchecked caries is ever progressing, and thus, valuable teeth are lost which might easily be preserved at first, nature having made no provision for their restoration.

We frequently meet with teeth, and roots even, still good and valuable in old age, that had been operated on for decay in early life; and, when unsuccessful cases are referred to reproachfully, the public ought to recollect, for its own advantage! that there are always two sides to a question, and two parties concerned in every operation on teeth. It is quite possible that the work may have been badly done at first, of which, however, mere failure afterwards is no sufficient proof, since the same treatment which would have prevented decay from taking place at all is afterwards required to prevent its renewal in teeth that have been filed or filled with metal. The dentist may possibly have been incompetent, but it is quite as likely that the

patient has been refractory, and arrested midway an operation agreed on and commenced ; for a tooth may be so cut up as not to retain a metallic filling, and yet not enough to be thoroughly reached with a toothbrush to the bottom of the decay, a condition absolutely necessary to success in preventing its further progress. If the habitual dirt, which softened and decayed a tooth when it was whole, is permitted to remain as before in its usual haunts, the bone softens afresh round the metallic stopping, and permits it to drop out ; or, worse than even that, conceals the dirt which it no longer prevents from gaining admission to the cavity, when the softening of the bone, which it has ceased to arrest, is in consequence renewed ; in which case the seat of the nerves is gradually laid bare, when toothache ensues as a matter of course, and the stopping is then said to prove a failure ! The dentist is blamed for the faults of the patient, and the patient, if unreasonable and will not see the true bearings of the case, consigns his remaining teeth to what he considers their unfortunate fate, hopeless decay, without any further effort to save them. If it be true, as it certainly is, that many

teeth are permanently preserved by the united operations of the dentist and patient, which were in a state of rapid decay, it is surely worth the while of all who have teeth to save to investigate the causes of success and failure, as well on their own account, as that of others, perhaps, depending on them for advice. Practitioners of experience and tolerable practice tell us that they frequently meet with teeth, still sound and serviceable in old age, which had been filled with gold or other metals or partly filed away on account of disease, in early life, whose correspondents in the other side of the same jaw had been extracted at the time, as being too far gone in decay to be saved.

It has been unfortunate for the teeth, perhaps, that their diseases, cause and effect, could be so easily got rid of at once by extraction, the distant consequences being generally lost sight of in the eager desire to be freed from a present pain. It requires an unusual degree of fortitude in a person under the influence of severe toothache to reflect that there are but thirty-two teeth in an entire set; that the set is divided into four classes, and that, when one tooth of a class aches, the others are in danger of being similarly affected,

unless precautionary measures be adopted at once, and carefully followed up through life. That party may be considered fortunate whose first decayed and aching tooth has been the means of awakening attention to the rest.

The teeth are intended, and therefore well adapted, for great labour, which cannot be delegated with impunity, unless it be to the unceasing and successful substitution of the toothbrush. As steel, exposed to a humid atmosphere without the protection of paint, or of daily cleaning and polishing instead, is sure to be eaten up with rust, as the body without constitutional exercise, becomes weakened and sickly, so the teeth, composing a system of separate and independent action within another system, when not duly employed in dividing and masticating food, or not otherwise kept severely clean by artificial means, become subject to disease; they soften and break down prematurely, often before the body has attained its full growth.

A very common subject of inquiry and wonder is, how it happens that animals, and even men who never clean their teeth, sometimes contrive

to preserve theirs so well, when the most painstaking cleaners often fail to do so. The reason is obvious enough, they unconsciously wipe and clean their teeth in their food, as forks are cleaned in piercing sand bags, or dirty combs in passing through flannel rags, and so preserve them from decaying. The American Indians usually wear their teeth down to the gums with rough and long continued use; and yet they neither suffer pain, nor do their teeth decay in consequence. On the contrary, their gums remain well up to the teeth in a thin, beautiful, and healthy condition to the last. Dr. Wm. Tolmie, an intelligent member of the Hudson's Bay Company, informed the author that, after examining several hundreds of Indian mouths, he never met with more than two or three decayed teeth; and even those belonged to chiefs who were in the habit of mixing with his people, at the distant stations. Wild animals at large possess sound teeth and gums; and yet, when caged up in menageries, and deprived of their usual food, and the power of playing with their prey, as cats do with mice and birds, &c., their

teeth gather tartar, their gums become spongy, and their sockets are absorbed; when their teeth either drop out prematurely, or decay, like those of human beings.

## DECAYED TEETH.

### PART SECOND.

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ALTHOUGH the preceding exposition of the causes of decay in teeth may appear sufficiently intelligible, satisfactory, and so far, instructive to the general public as either to suggest the necessary preventive and remedial treatment, or at all events serve to call attention to the necessity for seeking it ; there may be some who, disregarding the irksomeness of dry professional inquiry, would desire a more accurate analysis of the subject under review.

It must be obvious that there exists, during life only, some special cause for the decay of teeth, from which other bones though made of less durable materials are exempt ; and which, it is reasonable to suppose, is equally capable of

investigation as that of other diseases, and therefore equally amenable to treatment.

In further prosecuting the inquiry, it ought not to be lost sight of, that toothache, like other pains, is the result of diseases which might have been prevented at first, and greatly modified at any subsequent period, and, not the disease itself, as is frequently supposed, if one may be allowed to judge by the modes generally resorted to for its cure. Mere relief from present pain is almost universally all that is sought for, and that, without any reference to the diseases which occasion it, which are accumulative, and, therefore, preparing the way to render it chronic and incurable.

Mr. Hunter informs us, that the teeth are "singular in their structure, and some other particulars, and have diseases peculiar to themselves."

The peculiarities referred to may be considered under the following five heads:—1st. Their position in the mouth, which exposes them, unlike other bones, to atmospheric influences. 2nd. Their structure and growth, so unlike other animal productions. 3rd. Their slight, almost

artificial, connexion with the rest of the body.—  
4th. Their shapes and relation to each other as well as to the gums, and sockets. 5th. Accidental causes of decay.

1st. Position of the tecth.—All bones, with the exception of the teeth, are placed out of sight and under some natural covering which secures them from the direct action of the atmosphere, by which they are apt to be influenced injuriously, as much as wood or iron placed in similar circumstances. Other bones cannot be reached but in an indirect manner, either through the medium of bodily disease, or of violent accidents; while the tecth stand nakedly exposed to the ordinary causes of decomposition in their most active forms, as incessant alternations of heat and cold, moisture and dryness, which, when further aggravated by residence in unfavourable localities, tell with very sad effect upon them.

To increasc the evil, they are often permitted to be habitually loaded with foul tartar, which, when indurated, swells and inflames the gums, and dissolves their sockets; and, while in a newly deposited soft state, retains saliva like

sponge, especially at those parts placed out of the reach of natural friction from the tongue, lips, and food, till it becomes stagnant and offensive, as the breath of many, otherwise of nice habits, will abundantly testify.

The teeth possess no reparatory power, like other bones, or the nails, and hair ; and yet they are as liable to decomposition, though alive and in use, as stakes fixed in the ground, or rather as living trees, which nevertheless decay, at any spot, flaw, or fracture, where moisture habitually finds a settlement. Teeth in use cannot be painted over like rails to protect them from the weather, but they can be equally well preserved by much scrubbing and cleaning, assisted when necessary, by cutting away and smoothing diseased surfaces, and filling up, or hermetically sealing diseased holes.

2nd. The growth, or rather construction of teeth of mature size at once, and without their undergoing the usual process of growing from small to large, like other bones, is very peculiar, and will perhaps serve to account for their want of any reparative power. Other bones are sufficiently complete to be useful from the beginning,

and, without losing either their quality of usefulness, or the just and symmetrical proportion existing between them and the rest of the body, they go on growing together till they arrive at maturity; and even then, as if from the practice of growing, they appear to have acquired the habit, for they possess the power of self-renovation to a certain extent. When broken, other bones can heal up again, when diseased they can throw off the affected part, and even the jaws actually eject roots and diseased teeth; but to the teeth no such faculty remains, for they never possessed the power of growing from a small to a large size; they are fragmentary, mere broken pieces of teeth, and therefore useless until completed; they are born full grown and fit for immediate adult use, for the duties which they have to perform are of equal severity in infancy as in age. On this account teeth require to be harder than any other animal production; they are, therefore, formed of mature size at first, and allowed to indurate in security underneath the gum until fit for use. Teeth are formed as a ship is built, plank after plank is added to a keel of pre-arranged dimensions until complete, when it

can undergo no further change. The enamel is formed first like a shell; the interior walls of which are then plastered over with bone until no room remains, except a small chamber, the future residence of the nerves and blood-vessels, the actual parents of the tooth; and, last of all, the roots are added as the tooth is emerging from the gum. The body to which the teeth belong may be stunted in its growth, and remain dwarfish from accidental causes, while the teeth must necessarily have already attained their destined size in safety, and then perhaps appear to be too large for such a body. Teeth, therefore, once complete, can undergo no further change, except that of deterioration; they possess no self-renewing power, like other bones, and because their preservation is attended with more trouble than that of almost any other part of the body, some persons thoughtlessly imagine that the teeth are the least perfect part of the bodily system, while in reality they are the most wonderful and perfect.

3rd. The connexion of the teeth with the rest of the body is so slight as to make them be scientifically considered as mere excrescences—beauti-

ful and useful to be sure, but still not absolutely necessary, and only added afterwards to a body at first, as it often is compelled to be at last, complete without them. And yet, strange to say, guided by science, men can tell from examining even the fragment of a tooth, the kind, and probable size of animal, though extinct, to which it belonged. Only half buried in the jaw a tooth is held in its place, like a nail in a board, or a post in the ground, by the mere form or pressure of the surrounding medium, and can therefore be removed by force without injury ; on which account the extraction of a tooth is looked upon by all, except the actual sufferer, as a very small matter. The only real connexion of a tooth with the rest of the body is by means of the nerves and blood-vessels which are contained within it as in a bottle, which a tooth much resembles, and of the periosteum, or skinny membrane placed between it and its socket. The periosteum serves the double purpose of a covering to the root of a tooth, and of a lining membrane to its socket—or, a living pillow—or, to prevent the collision and consequent clash and jar of naked bones on one another. On extraction, the nerves and skinny membranes of

a tooth are torn asunder at the bottom of its sockets, and hæmorrhage follows the operation as a matter of course, sometimes to such a degree as to endanger life. It has, in fact, in some instances been the cause of death, in spite of the utmost available aid of medical science, for the truth of which statement see the "Lancet," and other medical publications. The intention, in referring to the subject here, is to recommend a simple and never failing remedy in such cases, viz., cotton-wool dipped in a thick varnish of gum-mastic dissolved in spirits of wine, which can be introduced with a probe into the vacant sockets, and made to assume the form of the extracted tooth with such precision as to prevent the escape of any more blood. White spirit varnish will answer the purpose equally well, or, in the absence of both, sealing-wax dissolved in spirits of wine, all of which become hard in the mouth in a few seconds. Very little time with such a plug will be sufficient to cure any case. The plug can be kept in its place by the pressure of the finger, or a piece of cork held between the jaws if necessary. This is one of the processes adopted by the author for conduct-

ing the cure of tender teeth previous to stopping with metal in a permanent manner, and was invented by him for that purpose, along with the anodyne cement, in the years 1826-7. For which, see the advertising columns of the "Lancet," "Times," &c., of that period, and a small "Treatise on the Care and Cure of the Teeth," by the author; first published by the Messrs. Longman, and Co., in the year 1829.

But to return to our subject,—it will readily be perceived that the structure of the teeth, and the manner in which they are connected with the body, deprives them of the means of restoring lost substance, and which, if it were possible, would in their case be totally useless; for the new dentine, if deposited in the interior of a tooth, would choke up the cavity of the nerves, a condition which would be attended with incalculable evil; or if on its outer surface, it would be rubbed off with use while yet in a soft state; or if in layers underneath the enamel, like the fibrine of trees, it would force the enamel either to be thrown off periodically, or to burst like bark, and then, be not only rough and ugly, but more than ever through its cracks expose the bone to decay.

4th. Shape of the teeth, a cause of their decay. Some teeth are more subject to disease, or rather present a greater number of assailable points than others of the same set, and that arises from their shapes and position in the mouth. The weak points in the shape of a tooth are the necessary result of its plan of construction, for a tooth does not grow, like other bones, but is formed at once, as a house is built, on its largest intended scale—the outer shell or enamel first, the internal walls of bone next—and last of all, the roots ; and, as it is incapable of further growth, so, neither does it possess any reparative power like other bones. The consequence of which is, that the slightest injury, for anything nature can effect to the contrary, often proves fatal to its existence ; and many a beautiful tooth—the hardest animal production of nature—decays, breaks down, and totally disappears in foul dust, long before the body to which it belongs has arrived at mature growth. The functions of the teeth are equally severe on their first emerging from the gums as at any subsequent period of their existence, and they are matured accordingly, and, unlike any other part, even before

their natural birth. The shapes of the teeth vary with the uses to which they are put, some being intended for dividing food, others for seizing and holding fast, and the rest for masticating. The shapes of the teeth which seize and divide are less complicated than of those which grind, being wedge-shaped and single, with only one root each, and therefore, with the exception of the four upper incisors which sometimes have flaws in the enamel of their posterior surfaces, free from one at least of the prevailing causes of decay in the rest of the same set. The grinders are divided into large and small, or molars, and bicuspid, the latter formed of two single teeth joined together, the former of several. Where the single teeth which make a double one meet, there remains a furrow, which is hereditarily so deep in some persons as to amount to a defect in the enamel, and the number of such furrows is regulated by the number of parts or single teeth of which a double one is composed. All these flaws are so many hot-beds of disease in badly cleaned teeth, for they retain the moisture of the mouth and relics of food habitually, till rotten and offensive, when they decompose the bone

with which they come in permanent contact. Any imperfection in a false tooth, whether it be of human or animal ivory, leads to its decay as surely as that of the original teeth, proving satisfactorily that all decay commences at the surface. We sometimes meet with instances where the front teeth are joined together, like double teeth—capital examples of which are preserved in the Museum of the College of Surgeons, London—and they often decay at the bottom of the furrow thus accidentally formed, like the grinders. They further serve to show how double teeth are made up of single ones joined together.

To illustrate still more how and why teeth decay in the deep lines natural to their surfaces, we may refer to the two other causes of caries, viz., what is called lateral decay, or that which takes place between any two in contact, and the softening which often takes place at their necks where they meet the gums. The part of a tooth which is buried in the jaw is of smaller diameter than that which is in sight, and when, from any cause, the gums forsake the teeth in ever so small a degree, a wider way is opened for the food to lodge in between them—and this is an evil created by the

presence of tartar—and the result is invariably the same as in the deep lines of the teeth. Holes take place between them in the bone of the teeth for want of successful brushing—for no part ever decays that is polished daily. Constant brushing, be it remembered, without intending offence, is not always successful brushing, as a toothpick could be made to prove in ninety-nine cases out of every hundred of uninstructed cleaning. The remaining form of decay is produced when food is permitted to remain habitually on the edges of the gums, as on shelves—if they happen to be spongy, so much the worse—the necks of the teeth soften, and rot quite away, opening a channel to the nerves of their interiors. We are justified, therefore, in thinking that the shape of the molar teeth is a primary cause of their decay ; and that the position of the others in the mouth, and in respect to each other, accounts sufficiently for the other two. It is no uncommon thing to meet with large grinders successfully preserved with metallic fillings in five or six separate places, every one of which had been attacked by disease, and any one of which would have been sufficient to destroy the entire tooth,

had not access to air and moisture been effectually prevented by the insertion of perfect plugs at the surface.

We constantly meet with upper incisors successfully preserved by having the indentations in their posterior surfaces filled up with metal. We also meet with examples in all teeth indiscriminately where lateral decay had been quite extirpated by filing a wide opening between them to admit of their being properly cleaned; or where after opening sufficient room for the entrance of a toothbrush, and holes still remained by filling them up rather than cut away too much of the healthy bone for the purpose of levelling the surface; and we further meet with decay at the necks of teeth successfully checked by efficient brushing, with the addition, when necessary, of a little metallic filling to level them.

It may probably here be asked, how it comes, that since all corresponding teeth are marked by similar lines, cracks, and wells of construction, they do not decay in all persons alike, seeing that many escape, and that even in the same family some of its members are very subject to decayed teeth, while others are free? The reason then is, that the lines are deeper in some teeth than in

others, even belonging to the same family ; for the shapes of teeth, and their liability to decay, are hereditary like the features of the face, and the parents may be persons, the one from a family having good teeth, the other bad. Any person that is willing to study what is here hinted at, will find it literally correct. In the case of teeth subject to decay ; on account of their shape, since it can be prevented by filling up the cracks with metal and rigid cleanliness, it would be well, if practicable, to examine the teeth of parents for the sake of children under management, and from their condition learn what was needful to be done ; for, left to nature, the results would undoubtedly be the same in both. Unless, perhaps, when either happened to have rocky teeth, a condition altogether arising from the state of health at the time of the formation of the enamel, and therefore accidental and not coming under the rule sought to be established above.

When decay is taking place at the neck of a tooth, or between any two, the candid inquirer will always find at last, that, owing to some mechanical difficulty in brushing, wiping, and rinsing the spot, or from willing neglect, a soft

dirty deposit is ever resting on it, assisted by the gum, a sort of natural shelf to hold it. This only requires to be perceived in order to be corrected at pleasure. Decay in the necks of teeth rarely extends to their posterior surfaces, which are necessarily wiped frequently by the action of the food, tongue, and saliva. Decay, in fact, never takes place but in a dust-hole rarely cleaned out by the toothbrush; and under whatsoever name it may be recognised and described, is nothing else but the simple softening of the bone, from atmospheric influences, and of the enamel, from acidity in the saliva. All decay of the teeth, then, has its commencement either in the lines, cracks, and wells found upon their surfaces; at their necks, where the enamel terminates in the gums; and between any two. This latter is called lateral decay, of which, however, there are two sorts—one, the lateral decay proper, the other, merely an extension of the neck disease. This extension of neck decay is always soft and filthy, and invariably commences at the edge of the gum—sure to be spongy—and has this further peculiarity, that it makes a succession of holes down the sides of the roots as the gums gradually recede,

an effect produced by tartar on the teeth, which expels the gums, and causes absorption of the alveolar processes. Lateral decay proper commences at the points of actual contact between any two teeth.

On extracting a tooth, a dark spot or hole more or less advanced in decay, will almost in every instance be found at the points of contact with other teeth, and those other teeth will be found to have similar spots or holes. The spots were, originally, as sound and white as the rest; and the dentists, before the invention of mineral teeth, used to purchase young teeth, free from such spots, at a great cost for their wealthy customers. To understand this sort of decay, let a person tie either two teeth, or other bones, formed like them together, and immerse them in water for a while. All bone will imbibe moisture to a certain extent, and look darker than before. Let them now be removed from the water and dried, when one spot between them will prove inaccessible to any drying process that could be applied to teeth in the mouth without separating the bones. That spot retains moisture by capillary attraction in almost a permanent state, that

can only be removed, or rather changed for new liquid by much rinsing and brushing as near to it as one can reach. When such teeth are separated with a file till the unsound bone is removed, and the new surfaces are then kept carefully clean, or if too hollow to be levelled with impunity, but not quite open into the chamber of the nerves, and that the cavity be afterwards properly stopped with metal, no further decay takes place for ever. We meet with cases still good in old age that had been so treated in early life. The difficulty attending success is greater when there is a disposition to acidity in the saliva ; but then, to save the teeth is worth all the trouble, and even false teeth would decay in such a mouth. Many persons place much reliance on the application of red hot wires and lunar caustic to decaying teeth, in order to char the part, and so prevent the spread of caries ; but it is obvious that such means can only be successful for a very short time, as the effect must soon wear off in the moisture of the mouth, when the softening process will undoubtedly recommence. Besides, the practice has this further disadvantage that, relying on the work of another, the patient neg-

lects his own case ; and he ought therefore to be duly assured that nothing but severe daily cleaning can permanently preserve his teeth. The cleaning of teeth can no more be delegated to others than the chewing of one's food.

5th. Accidental causes of decay.—Of the various accidental causes of decay in teeth, rocky or honey-combed enamel, if not the most certain, is by far the most obvious from its position. Rockiness or deficiency of enamel is the result of constitutional weakness at the time of its formation, and may take place in an equal degree, whether the affected teeth be hereditarily good or bad ; and we accordingly often meet with rocky teeth still good and in working condition in old age. At the same time, there can be no doubt that it greatly accelerates the decay of teeth predisposed to it, or when under the influence of acid saliva and other active agents of decomposition.

Rockiness is restricted to the successors of the first set, and the first series of large molars, called the six-year-old teeth, the enamel of all which is completed, underneath the gums, before the sixth year of age. As rockiness is produced by some temporary derangement of the bodily

system, being under the influence of calomel for example, it takes place on those teeth only, and at the parts of them, whose enamel is being formed at the time; and it is no unusual sight to find three or more attacks of such illness, with intervals of health between, distinctly marked upon the teeth in separate strata. The reason why each stratum does not remain permanently at the same distance from the gum in all the affected teeth, is, that some of them were more advanced in growth than others at the period of the attack; so that, while some are marked near the gums, others are probably in the same condition at their cutting edges.

The same disease which marks the central incisors can invariably be traced on the four large molars, or six-year-old teeth, as they are coeval in their growth; and the bicuspid, which are of later growth, often pass unscathed, while those on both sides of them suffer.

In some cases the rocky holes are so shallow as to be reached to their bottoms by the cleansing influence of the tongue, lips, and food, when they consequently escape decay; and in almost any case they could be reached by a penetrating toothbrush,

and so preserved, more especially if the deepest holes were successfully filled with metal, and spaces opened between them, as in the case of lateral decay, in order to admit the toothbrush and other suitable appliances. It is unnecessary to go on multiplying cases of accidental causes of decay, for they all resolve themselves into one or other of the regular forms at last, and merely require more pains in cleaning, on which alone the safety of all teeth ultimately depends.

## STOPPING OR FILLING.

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STOPPING is an operation performed on teeth to arrest decay, and consists of filing and levelling diseased surfaces, and of picking and cutting out carious bone, and then filling up the holes with metal, so as to render decayed teeth artificially sound. Stopped teeth often last for life ; not however because a metallic plug, or the healthier surface newly exposed by filing, is more durable than the original bone if properly treated would have been, but because the patient, now taught by experience, bestows more time and labour on cleaning and polishing the part ; success in which, when thoroughly and habitually attained, never fails to prevent decay, or to check its progress at almost any stage. From which, it is to be inferred that the same treatment which saves a

stopped tooth from further decay, would, if adopted in the first instance, have altogether prevented the original disease from taking place, and consequently all necessity for performing an operation.

When a stopping, therefore, proves unsuccessful, as it frequently does, the dentist is not necessarily to blame, as many are apt to suppose, although he possibly may be; for if his workmanship be imperfect, or the materials he employs not the best adapted to the case, air and moisture, the promoters of disease, are admitted as before, and the caries proceeds as if nothing had been done to prevent it.

But the fault more frequently rests with the patient himself, who ignorant of, or indifferent to the cause of decay, or perhaps incapable of performing so mechanical an operation, permits slimy decomposed matter to rest upon the stopping as before; when, as a matter of course, decay of the bone will recommence around it, and gradually permit the plug to drop out, or worse even than that, remain in a loose state concealing the disease which it no longer checks; and it is his interest to know the truth however unpleasant.

The principle on which metallic stoppings pre-

serve teeth is often much mistaken, owing to a want of knowledge of the origin of decay, its manner of proceeding, and, how or whether it can be prevented or stopped. One is almost induced at times—from the remarks made—to suppose that a gold stopping is expected to act as a sort of charm, rather than a substantial and perfectly ingrained substitute for the lost bone. The caries of teeth very much resembles the rust of steel; they both begin at the surface, from exposure to atmospheric influences, and when permitted to run their natural course unchecked, they both eat up, and utterly destroy the substances they attack. If a rusty plate of iron be scraped and polished clean, it can be preserved in that state by similar attention to it every day, and so it is exactly with teeth, for which, unlike iron, which can be preserved by galvanism or paint, there is no other remedy. If we now suppose the plate of iron to be corroded into holes, but not unworthy of repairs, and that the holes are filled up with gold, on account of its greater durability in the open air, instead of iron; it must appear plainly obvious, that if exposed, as formerly, without paint or daily cleaning, the iron will corrode

about the gold plugs, though they themselves are indestructible, and allow them to drop out. Thus it is with teeth, however excellent the plug; their carious surfaces can be filed and levelled to the depth of the disease, not only with impunity, but with very great advantage, provided only, it has not too nearly approached the internal natural cavity of the tooth where the nerves are situate; and, if it has, instead of filing, or at all events filing so deep, the carious bone is only picked and delicately cut out, and the hole filled up with gold, if at all practicable, on account of its natural indestructibility.

But it is not always possible to stop teeth successfully with gold; the cavity may be deep and near the seat of the nerve, and consequently too tender to the touch to bear the requisite pressure; or the walls of the cavity may be so weakened by disease, as to be in danger of breaking down under the operation, in which case gold would not be so suitable as some other metals; for, be it always remembered, in managing decayed teeth, that the sole object in view is to exclude air and moisture from the cavity. The metal which stops a decayed tooth must be as

solid as if it had been melted in its place, and as perfectly in contact with every part of the cavity as enamel is with the bone, and equally impervious to air and moisture, else the operation is worse than useless, for it puts a person off his guard.

Gold, silver, platina, and tin, made into leaves, are employed as stopping materials, and it may easily be understood that they each require very great pressure, and fine manipulation to render them solid and effective ; and, if the cork be bad the wine is lost. Tin, which, in its solid state, is softer than the others, can be rendered an efficient stopping with less pressure, for it can be worked as easily as lead ; and, with suitable instruments, sufficient experience, and perseverance, it can be elaborated into the finest lines and cracks, and against almost the weakest walls ; while gold, the most ductile of metals, and the most seductive of stoppings, requires to be frequently nealed or made red hot to render it malleable. This quality, then, since a stopping must be completed on one nealing, renders it inapplicable in some cases, and teeth are therefore sometimes lost with gold that might very

well have been preserved with tin ; and tin is considered a sufficiently pure metal for the purpose, if we may judge by the various uses to which it is with public approbation applied. As to the durability of tin, the author has seen an effective tin stopping in a tooth of Cramer's, the celebrated musical composer, which had been placed there thirty-five years before, by Talma, of Paris ! He has also seen a tooth successfully preserved with a small shot which had accidentally stuck in the hole while chewing game, and which it was found easier to press further in with mastication than to get it out ; and another case, that of a lady, who, being in India at the time, and out of reach of professional assistance, filled her own tooth, nearly thirty years before, with a small piece of lead. In all these cases, air and moisture happened to be successfully excluded.

We thus see that any material which can be made to exclude moisture will save a decayed tooth ; while failure in stopping may as readily arise from the materials employed, when not suited to the particular case, as from the manner of applying them.

For the choice of stopping materials the public

themselves are often to blame ; as when, without reference to the state of the case, they insist on having gold, the successful insertion of which would either break the tooth, or occasion immediate pain, or be incapable—owing to the hardness it acquires under manipulation—of being sent thoroughly home into all the intricacies of the cavity ; which, perhaps, would not admit of being fairly opened up owing to the vicinity of the nerves. No person ever yet succeeded in successfully stopping every possible case, with gold only, in such a manner as to render the teeth permanent ; and any one, who thinks he has, only deceives himself. Nor is it fair to abandon a tooth, which could be preserved by other means for some years at least, merely for a crotchety preference for gold. It is gratifying, however, to think that there is a reasonable prospect of having gold so prepared as to be capable of being put into a tooth with the facility of amalgam, and like it to harden there.

The carious cavity of a tooth, when carefully cleared of decomposed matters is sometimes full of lines, furrows, and ridges in the remaining solid bone, which it would often be a pity to level to

the bottom ; or perhaps impossible to do so with safety to the nerves and strength of the tooth. All such might be advantageously filled in and levelled with tin ; and then the remaining hole, with its smooth insensible sides greatly strengthened, could be advantageously filled up with gold, if the case would bear it, if not with a final tin plug. . But the process is tedious and laborious, and it is not pleasant to be thought of, as if only shabbily sparing the gold, for one's pains !

The public ought to encourage the preservation of teeth more, and the use of false substitutes less ; and then the arts of stopping, cleaning, and regulating would be more generally understood, and practised with greater success, and to a much greater extent ; especially in the country, where a dentist, like a watchmaker, is expected to excel alike in every department of his profession,—an utter impossibility.

In addition to leaf stoppings, all of which require great force, labour, and experience to render them solid and efficient, amalgams composed of quicksilver and other metals, are very generally employed, and with considerable success, especially in teeth too much decayed to bear

pressure and hammering. Amalgams are applied in a soft state, and they harden in the teeth ; but they are attended with this disadvantage, among others, that when inflammation supervenes, as it sometimes does in chronic cases, and that the holes which they fill are larger inside than out, they cannot easily be withdrawn ; or, without inflicting greater torture than that of extracting a tooth. The amalgam longest known, and decidedly the worst, is composed of quicksilver and silver reduced to powder, either by filing or precipitation. This preparation hardens with a rough gritty grain, and permits moisture to steal its way gradually into the cavity around it, when, in consequence, the hole becomes larger, and the stopping drops out at last ; in addition to which, from its caustic properties, it blackens the teeth irretrievably. The component parts of this amalgam, however, can be so mixed together as not to become very hard ; that is, too hard to be picked out in case of inflammation, and can, therefore, be rendered useful in extreme cases as a sort of temporary stopping ; for teeth, much decayed, are less likely to become inflamed with a bad than with a good stopping ; and with a suc-

cession of temporary stoppings, judiciously applied and watched, they often acquire strength and insensibility. A fistulous opening, in connexion with the seat of the nerves, left in the plug for the escape of matter, will prevent inflammation in chronic cases, so that whatever portion of such teeth still remains can be stopped in a more permanent manner and rendered useful.

A great improvement on the above amalgam is a sort of malachite, invented by Mr. Sullivan, the basis of which is copper, and in its compound state appears to be as harmless in the mouth as mere ore. It may not be out of place here to remark, that a sort of hue and cry is often raised against the stopping of a tooth, if it happens to ache afterwards, which is due simply to its state of disease at the time of performing the operation. Any plug, even cotton-wool dipped in mastic-varnish, gutta percha, India-rubber, or any other substance so applied as to be air and water-tight, and consequently capable of confining within a carious tooth the proceeds of a deep-seated chronic ulcer, hitherto open and free, will produce the same amount of pain as metal similarly placed. This any one can prove by removing the plug,

when blood or matter will flow, sometimes in a strong jet, and afford immediate relief. It is the interest of the public to know this, instead of joining in the unreasonable clamour against any particular metal, as the cause of suffering, to their own great disadvantage; because teeth, in the condition here referred to, are in general capable of being cured, like other deep-seated ulcers, and afterwards permanently stopped in the usual way. A fistulous opening in connexion with the internal channel of the tooth will prevent the painful manifestation of such a case, and occasion ignorant admiration of the plug, whatever may be its nature. Sullivan's amalgam is singularly free from grit, and produces scarcely any perceptible difference in the colour of a tooth, although itself turns black on the surface, unless when it happens to be placed in the way of great friction during mastication, or is daily polished very clean with a toothbrush and powder, when it will keep its place and preserve a tooth longer than almost any stopping whatever. It is so easily applied, that an operator can sometimes save a dozen teeth, almost unconsciously to the parties most concerned, when they happen to be hurried,

or indifferent to their own interest in the matter ; and who would not perhaps devote the time requisite to fill them successfully with gold or tin, or even pay the price of the time and labour required in applying them ! It will scarcely be credited that many persons voluntarily permit their teeth to rot and die away, provided pain is staved off, rather than submit to the slightest operation requiring time, thought, or money !

An amalgam of quicksilver, tin, and cadmium, in about equal parts, which does not change colour, unless it be very much neglected, when it decays, has lately been invented by Dr. Evans, of Paris, as a temporary filling for tender teeth.

If cleaned and polished well it will last long, and is easily repaired, and therefore suitable to front teeth, always supposing gold to be impracticable, because it retains its whiteness, and does not change the colour of the teeth. Besides, it never acquires a degree of hardness greater than tin ; in common with which it has this great advantage over some other stoppings, that it can, if found necessary at periodical inspections of the teeth, be spread and worked into any lateral defects that may happen to be taking place around it,

without adding new material, or removing the old—an advantage of great importance to tender teeth in progress of cure—and which are intended to be filled in a more permanent manner on their perfect recovery from pain and sensibility. This stopping was much cried up at first, and afterwards unjustly condemned for want of fair play. No other stopping is so well calculated to test the cleaning powers of the patient, for when neglected it turns to yellow paint.

An improved amalgam has been introduced by Mr. Ash, consisting of quicksilver, tin, gold, and silver, which has in a great degree removed the acknowledged objections to amalgams as stoppings for teeth. Ash's mixture becomes sufficiently hard, and is not apt to decay; but, in common with everything of which silver forms a constituent part, it becomes black without much cleaning. All stopped teeth, however, ought to be looked on as things repaired, which may possibly require a stitch now and then. The original cause of the decay can never with safety be lost sight of in preserving teeth.

It is unnecessary to offer any instructions with respect to the instruments employed in stopping,

or the manner in which they ought to be used, for the public cannot be required to fill their own teeth ; and the ingenious dentist, however young, will never experience difficulty in selecting and constructing the tools with which he has to work. His constant difficulty will ever be to know the use he is to make of them, in every case,—to succeed in the due preparation of teeth for filling,—and in selecting the materials most suited to the case in hand ; and above all, the true intention of the operation.

It concerns the public to know, however, that decay between two teeth cannot be got at, either for the purpose of stopping in the first place, or cleaning the part afterwards, without filing the diseased teeth apart, because it often depends on themselves whether the operation is properly performed or not ; they are not to expect the dentist to perform a miracle : the outside of a closed window cannot be cleaned from the inside. If the teeth are tender to touch, the reader is referred to the treatment recommended in the chapters on toothache and decayed teeth, before submitting to painful operations in filing, cutting, or stopping.

Lateral decay, if detected early, can be easily and totally filed away ; but early detection of lateral decay is the most difficult part of the practice of the dentist, unless it be that of convincing the patient of its existence, before it becomes obvious to the unpractised eye. On this account many teeth—especially in front—are lost, which could very easily be preserved by opening a passage between them for the admission of the toothbrush. It would be only repeating here, what has already been said elsewhere, to dwell longer on this part of our subject.

Some practitioners separate teeth temporarily with wedges, instead of permanently with files, to stop lateral decays ; by which practice the sockets are injured, and the lining membranes inflamed, without lasting benefit. Because, when the teeth return to their places, the difficulty of cleaning between them is as great as ever ; and then the results are the same as before, the decay invariably recommencing around the stoppings, permitting them to drop out, if indeed—a thing much to be doubted—they had ever been sufficiently inserted.

## DENTITION.

### INTRODUCTORY.

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Most animals, endowed with teeth, require two sets, one deciduous, the other permanent. The deciduous teeth are adapted by their size and number to the diminutive jaws of early life only, and they are therefore, in due time, shed; the permanent ones in like manner to those of mature growth, and they remain for life.

The arrangement by which one set of teeth—forming a solid and firmly fixed portion of the body—is thrown off completely, and another substituted, is well calculated to excite the attention which it generally receives; aided, without doubt, as the recollection of it must be, by the ever recurring pains of dentition, during the whole period of

its protracted existence ; extending, as it does, to about a third part of a healthy life ; and, all the while, attended with local and symptomatic disturbance, to which the growth of other parts of the body presents no parallel.

The reason, then, why two sets of teeth and not of other bones are required, is that teeth, from structural conformation, are incapable of increasing in size, like the rest of the body, after their first formation ; and, as a consequence, spaces take place between them in the growing jaws, which, if left permanently open, would not only be unsightly, but inconvenient for mastication. The severe duties which the teeth are especially called upon to perform from the beginning, render it necessary that they should be full grown, and perfect in every respect on their first emerging from the gums ; up to which period, and unlike other organized bodies in a state of growth, they are fragmentary and unfinished—mere pieces of teeth.

Although complete teeth are incapable of growing larger, neither are they, like bottles, blown to their full size at once ; but formed gradually on the largest intended scale from their commencement, just as a house or ship is built ; the outer shell or

enamel first, then the bone which is evenly plastered on the inner wall to the required thickness, leaving only room for the permanent residence of the nerves and blood-vessels ; and last of all the roots are added, at the proper age, for the purpose of pushing forward the teeth, and securing them firmly in their sockets.

The nerves and blood-vessels are the remains of the parent pulps from which, planted in slight grooves along the edges of the jaw bones, the materials forming teeth are originally eliminated ; and, for the sake of greater security, they remain ever after in the natural internal cavities of their rigid offspring, as in bottles, which the teeth greatly resemble ; their connexion with the general system of the body is thence continued through open channels in the roots which are tubular, and they are thus enabled permanently to support the vitality and ever watchful sensibility of the teeth.

The teeth are the only bones not placed by nature under permanent covering, or that are brought into actual contact with external influences, the source of all their suffering in after life ; and in order to meet the difficulties with which they have consequently to contend, they are permitted to complete their growth in security within

the jaws, and without being called upon like other parts to perform any duty during their transition state. But, as a drawback to early maturity, after they have once taken up their intended positions in the dental row, they can undergo no further change except decadence ; and we accordingly find, in the human subject more especially, that teeth frequently decay entirely away before the rest of the body has attained its full growth. Other bones, as if they retained the faculty of growing after attaining mature growth, can repair injuries to a considerable extent ; when broken they can re-unite, when diseased they can throw off the affected part ; while the slightest flaw in a tooth, whether resulting from constitutional debility at the time of its first formation underneath the gum, or from subsequent accident or neglect, remains a blemish ever after, if it does not occasion decay ; and decay in teeth, like rust in steel, unless it be checked by art, never ceases, but with the total annihilation of the substance on which it feeds.

If teeth could increase in size, like other bones, one set would be sufficient, for its members would continue to adapt themselves to the growth of

the jaws, and fill them up completely at every stage of life. But it must appear obvious, that continuous growth would be incompatible with permanence, because the new dentine, if deposited on the surfaces of teeth, would inevitably be worn away with use before it could attain the requisite degree of hardness ; or, if added underneath the enamel, that beautiful shell, like oak-bark, would have to burst periodically and remain rough, or be entirely thrown off, in order to make room for the increase.

The only other conceivable substitute for the bone of teeth would be horn, which, as in the case of the nails, might undoubtedly continue to grow, but which, necessarily steeped in perpetual moisture, could never become sufficiently indurated to perform its function of dividing tough substances, like scissors, or grinding them like millstones.

The temporary teeth drop out spontaneously, not from decay, but in consequence of the loss of roots, which are absorbed on the approach of their successors, the second teeth ; and although the permanent set, necessarily more numerous than the temporary, consists of

first, that is of teeth that never change nor have successors, as well as of second teeth, no absorption of their roots ever takes place, nor can they drop out while their sockets remain.

Human dentition occupies a period of twenty years and upwards, and consists in cutting fifty-two teeth in all, of which twenty are temporary and drop out, and thirty-two permanent. The temporary teeth commence shedding in the seventh year, and take five or six years more to complete the change, for they are succeeded one by one, as they fall, by an equal number of second teeth, which, together with twelve more that never change, make up the full complement of thirty-two permanent teeth.

When a shedding tooth falls out naturally, its successor may be looked for already rising into the vacant space, and, with broad shoulders, maintaining its post against the intrusion of adjoining teeth while acquiring roots, the last part of a tooth that is formed, and by means of which it is to be raised into its place, as on stilts, and fixed permanently in its socket; but if the shedding tooth be lost prematurely, or before its successor—whose period of completion no art can accele-

rate—is ready to take its place, the vacant space is soon choaked up irregularly by the approach towards each other of adjacent teeth, that being nature's method of filling up gaps in the growing jaws. And when, at last, the proper tooth arrives at the right time, but in a wrong place of course, no alternative remains but either to extract itself, or others of equal value in order to make room, or to submit to irregularity, thus needlessly created, perhaps for the remainder of life. This is familiarly and extensively illustrated in every day practice by the too early removal of temporary eye-teeth, to make room, not for their own proper successors whose natural period may be years off, but for the incisors which are larger than their predecessors, and, in cases of early cutting, are crowded for a time in the still growing jaws.

The corresponding teeth do not always cut the gums at the same age in all children alike ; and in the case of twins, for example, one may be born with a couple of incisors in sight, which in the other may not make their appearance for six or even twelve months, and yet no ill consequence ensue ; unless it be in the case of the former,

whose jaws may happen to be too small by a year's growth at the time of cutting the usual complement of incisors—a circumstance which too frequently leads to empirical treatment at that early period of life.

There are other causes for the premature loss of shedding teeth, the principal of which is decay, for children's teeth are equally subject to decay as those of adults, and ought to be preserved for their natural period with equal care, in order as well to preserve due room for their successors, as to prevent the suffering attendant—not on dentition, which is in some degree inevitable—but on decayed teeth, which, with continuous care, is quite practicable.

Permitting temporary teeth to rot away gradually with risk of pain, and without an effort to preserve them sound during the natural period of their brief existence, “because they are to be lost at any rate,” is about as reasonable as to neglect their more permanent successors because the “body is to die sometime or another, and may not long require them.” Besides that, the sentiment embraces great cruelty to children at an age when they are incapable of judging for themselves.

Teeth invariably commence decaying at the spots permitted to be habitually foul with decomposed food, as iron or wooden railings do without paint or daily scrubbing; and may therefore be prevented.

The pain arising from dentition can be alleviated by opening a way for the coming tooth as often as may be required, without the infliction of pain or any other ill consequence.

Regularity in the dental rows is to be secured, should nature not be propitious, and she is rarely otherwise, by a patient study of the case, as for example, the age of the child at the time, and the period of cutting each tooth, assisting by simple mechanical contrivances when necessary; but above all, in judiciously abstaining from too active measures, which often prove more injurious than following the prescriptive advice of letting well alone.

The following descriptions of dentition, with a knowledge of the facts referred to and explained above, are intended to place the guardians of children in a position to judge for themselves, with, or without the assistance of a dentist.

## DENTITION.

### THE TEMPORARY TEETH.

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THE natural complement of the first set, or temporary teeth, is twenty,—that of the second, or permanent, thirty-two.

The temporary or shedding teeth begin to cut the gums when a child is about six months old ; and, they usually take more than two years to complete the set. After completion, they remain an entire set for scarcely more than three years, when they begin to be shed in the seventh year of age, giving place to successors of the second set, as each of them falls out.

Shedding the entire set occupies a period of from five to six years, so that in general the race of the temporary teeth is run by the time a person has attained the age of twelve years ; not

so however, the effects they may have produced on the destiny of their successors, with which they have more to do than is generally supposed.

The teeth are essential, if not absolutely necessary to health, speech, and personal appearance ; and yet, scientifically considered, they are foreign bodies, mere excrescences, forced under unfavourable circumstances on a bodily system already apparently complete without them.

Their situation and growth, as well as that of their bony sockets, which are concealed underneath the gums, and which they have to displace and perforate, sufficiently account for the suffering occasioned by dentition. The pulp or seed from which a tooth takes its rise is placed in a slight groove running along the originally narrow edge of the jaw bone, so that when the tooth and its necessary accompaniment, the socket in which it is to be fixed, begin to grow, the edge of the jaw bone widens, and in adults an increase of about three-fourths of an inch is added to its depth ; the consequence of which is, that the gum, a hard and semi-cartilaginous substance, is strained and swollen beyond its natural dimensions, and inflammation more or less severe

ensues, from which relief can only be obtained by slitting it open with a lancet, or by the final protrusion of the tooth. The maturation of a tooth is slow, and the irritation which it occasions comparatively small at first, but of long continuance, and accumulative in proportion to the growth of the exciting causes; and although robust constitutions are but slightly affected by the process, those that happen to be weak often undergo an amount of suffering that requires to be seen in order to be understood.

The celebrated J. Hunter describes the effects of dentition in the following terms:—

“Teething is productive of local and constitutional complaints with local sympathy. The local symptoms are inflammation, heat, and swellings of the gums, and an increased flow of saliva. The constitutional or general consequential symptoms are fever and universal convulsion, attended by diarrhœa, costiveness, loss of appetite, eruptions on the skin, especially on the face and scalp; cough, shortness of breath, with a kind of convulsed respiration; spasms of particular parts; an increased secretion of urine, and sometimes a diminution of that secretion with a discharge of matter.”

What happens in the case of one tooth may occur with each of the others, or twenty times during the first dentition, and twelve times afterwards with teeth that never change. Second teeth do not occasion much pain, the way being already opened for them by their predecessors, the shedding teeth. Slitting open the gum with a lancet over the coming tooth will always afford immediate relief and, if not delayed too long, prevent much of the consequences of bad teething. The same Mr. Hunter observes :—

“As far as my experience has taught me, to cut the gums down to the teeth appears to be the only method of cure. I have performed this operation above ten times upon the same teeth, where the disease had recurred so often, and every time with absolute removal of the symptoms.”

With reference to the commencement of dentition, a subject of constant inquiry, it may be observed that on examining the skull of a new-born infant, it would be found that ossification of all the shedding teeth had already taken place to a considerable extent, and a commencement made of even the first four large permanent molars, or twenty-four teeth in all. These molars are

noticed here, only because, owing to their very early appearance, they are apt to be mistaken for shedding teeth, and like them, they consequently run a great chance of being neglected. Some children are born with one or more teeth already cut, while others do not commence teething for the first year or more ; but without experiencing any unpleasant consequence in either case, for nature generally puts all right at last.

The teeth derive intelligible names from their shapes, the nature of their employment, and their position in the jaws ; and are further divided into classes, of which there are three in the temporary set, and four in the permanent. The following arrangement may be received as a near approximation to the periods of cutting.

#### THE TWENTY TEMPORARY TEETH.

##### MONTHS.

- |          |        |                                                                                                                                                    |
|----------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| At about | 5—8.   | 4 incisors, the two front teeth in each jaw.                                                                                                       |
| At from  | 7—10.  | 4 lateral incisors, the second tooth from the centre, in each side of both jaws.                                                                   |
| At from  | 12—16. | 4 grinders, the fourth tooth everywhere from the centre of the mouth.                                                                              |
| At from  | 14—20. | The 4 eye-teeth, the third tooth in each side, from the centre of both jaws.                                                                       |
| At from  | 18—36. | The 4 last grinders of the temporary set, the fifth tooth everywhere from the centre of the mouth, completing the complement of 20 shedding teeth. |

With respect to managing first teeth, in so far as lancing and medicine are concerned, it is only necessary to advise, in the case of children who experience little or no inconvenience from teething, "to let well alone." In the case of decayed teeth, however, acting on this maxim is unfortunately too often at fault; and be it remembered that the mere absence of pain is no proof that decay is not present and in full activity. The structure of the teeth is calculated to resist decomposition more than any other part of the body, and yet they often are the first to decay. The teeth of children are quite as liable to decay, toothache, and premature loss as those of adults; and the premature loss of first teeth leads to contraction of the jaws, and irregularity of the second; reasons sufficiently cogent, it is to be hoped, for the earliest possible attention to them; first, on the part of the nurse, and next, on that of the dentist, should his assistance be required for filing away disease, or filling up carious holes with metal. A good nurse usually cleans the mouth of a child with a piece of sponge, which, fixed in a pencil, may with great advantage be extended to the teeth to wipe them

clean and dry. A small toothbrush may also be employed as soon as a child will bear it, to pick away the relics of food which cannot be reached with the sponge, and which, when permitted habitually to remain, are sure to decay the teeth ; nor does caries ever come but in a spot where the toothpick would at any time find something soft and dirty to remove. The constitution of the gums requires that they should have a great deal of friction, whether by natural or artificial means, and bleeding, if they be tender, only does them good.

## DENTITION.

### THE SECOND SET OF TEETH.

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THE regular complement of first or temporary teeth is twenty—that of the second or permanent thirty-two.

The temporary teeth drop out spontaneously before the fourteenth year of age, commencing in the seventh, from the mere loss of their roots which are unconsciously absorbed; and each of their places, alveoli or sockets, of which there are twenty in all, is filled up with a permanent successor or second tooth, as soon as it becomes vacant.

The successors of the temporary teeth are therefore justly entitled to be called second teeth, but as the second or permanent set consists of thirty-two, they are all apt to be mistaken for second teeth, which they are not. The second set of teeth

then is composed of twenty real second teeth, and twelve others, in new situations, which are never shed.

A set of teeth is divided equally between both jaws, and consequently consists in the first set of ten, and in the second of sixteen in each ; and, the teeth in one side of the mouth correspond exactly, only right and left, with those placed opposite to them in the other. The teeth of the lower jaw differ very little in appearance and other characteristics from their antagonists in the upper, only perhaps in the circumstance that those placed in front of the mouth are somewhat smaller in size.

The teeth are divided into classes which grow naturally out of their shapes and uses, as incisors, cuspids, and molars, names common to both sets ; but as the second is more numerous, it has an additional class, the beautiful fillgaps called bicuspid. All the teeth of any one class, or at least a series of four of them, when there are more, usually cut the gums at the same time ; and, as they are possessed of the same shapes, employed for the same purposes, and exposed by position to the same influences, they all, if any, become diseased about the same time ; and that

too, at the corresponding spots of each in all mankind, whether the teeth be natural or artificial. So that pain in any one tooth ought to suggest recourse to precautionary measures with the rest. This is one of the nicest points in the management of the teeth ; for it is often difficult to discover the commencement of disease, and still more difficult to convince the patients and their friends of its existence, until the breaches are either too large, or too tender to be repaired in a permanent manner.

Some of the teeth are subject to decay at a greater number of points than others, belonging even to the same set ; and that is occasioned by their shapes, which become complicated, in proportion to the number of parts of which they are made up, and in consequence of which they present a greater number of furrows, lines, cracks, and wells, the recipients of decomposed food and saliva, the ordinary causes of decay. The incisors and eye-teeth in front of the mouth, for example, are single wedges, with plain unbroken surfaces ; they therefore possess fewer points of attack than the bicuspid, or small grinders, which are composed of two single teeth

joined together, with furrows between them. It follows that the bicuspid's have points where disease can originate peculiar to themselves, in addition to those they possess in common with the single teeth. And last of all, the molars, or large grinders, being made up of a bundle of single teeth, with numerous lines, cracks, and wells, incident to their structure, are proportionally liable to be attacked by diseases of their own, in addition to those of the two former classes; and strong though they seem, they suffer accordingly in a much greater degree. An accurate acquaintance with these facts often enables the dentist, when occasion offers, to put his patient in the way of avoiding, not only toothache and the loss of teeth, but the causes of those diseases which occasion them. For toothache, be it always remembered, is not itself the disease (as many appear to think, if one may judge from their methods of treating it), but the consequence of diseases which are equally amenable to treatment, both preventive and remedial, as any others.

We must not, however, forget that our principal business in this place has reference more to the regularity than the safety of the teeth; which

latter is fully discussed elsewhere, although it is often difficult to avoid dropping useful hints whenever the subject appears to suggest them.

It is, of course, necessary to know the names, places in the jaws, and periods of making their appearance of the second teeth, in order to be able to regulate as well as to preserve them.

THE THIRTY-TWO PERMANENT TEETH CONSIST OF

8 Incisors, the four front teeth of either jaw.

4 Cuspids, or eye-teeth, the third tooth from the centre of the mouth in both sides of either jaw.

8 Bicuspids, or small grinders, successors to the molars of infancy, and the only teeth which are smaller than their predecessors. They are the fourth and fifth tooth everywhere from the centre of the mouth.

12 Molars, or large grinders, the teeth that are — never shed, nor have successors ; they  
32 are placed the sixth, seventh, and eighth tooth from the centre of the mouth in either side of both jaws.

FIRST.—The incisors have wedge-shaped sharp

cutting edges, which, arranged as they are in two compact rows, form very efficient knives, whose action is, that of a powerful pair of scissors. The incisors are single teeth, and possess but one root each. The enamel therefore, which covers their bodies or parts visible above the gums, is a perfect and unbroken shell, which, by excluding air and moisture from the bone, tends, like paint or varnish on timber, to preserve them. In some instances, however, a deep line, crack, or minute well remains in the posterior surfaces of those of the upper jaw, as if the enamel had not been quite completed at the part ; and there, unless the defect be artificially repaired—filled up with metal—the moisture of the mouth gains admittance, and being placed beyond the reach of wiping, it remains till it rots, and then it decays the tooth. In this way, and from so simple a cause, the whole internal structure of the upper incisors will dissolve and disappear, sometimes even without pain, and consequently without the knowledge of their possessors, unless attention should happen to be drawn to them by their gradually changing colour. Those who happen to be sceptical as to the causes of decay in teeth,

are referred to the exactly analogous case of standing trees, whose interiors frequently soften and decay away from the admission of air and moisture, through some flaw in their surfaces.

SECOND.—The cuspids or eye-teeth are single, like the incisors, and with but one root each; they are, however, longer and stronger, and possessed of thicker enamel, which is consequently darker in colour. The cuspids form a firm but graceful barrier between the incisors and back teeth; their action is much the same as that of incisors, although well calculated, and, in the absence of hands, intended to seize and hold fast. The enamel of the eye-teeth, and of the incisors of the lower jaw, is more complete and unbroken than that of any other teeth, they are therefore exempted from one of the principal causes of decay in all the rest. For further information on this subject, the reader is referred to the article on decayed teeth.

THIRD.—The bicuspid, or small grinder, are the only teeth of smaller size than their predecessors,—a peculiarity favourable to the regularity of the second set;—for as they do not make their appearance in general till about the conclusion of

shedding, they often afford ample room for the full complement long after the case was supposed to be incurably crowded. Although double teeth, and partaking more of the characteristics of molars than that of incisors, the bicuspid are as fine, white, and delicate looking as the incisors themselves; and they assist in gracefully softening the distinction between the smooth single, and rough double teeth at the extremities of the jaws. The bicuspid have but one root each in the under jaw, while they possess two in the upper, in order to take a firmer hold of their sockets. They appear to be formed of two cuspids joined together.

We meet with instances of front teeth similarly united, of which there are some fine examples to be seen in the Royal College of Surgeons, London, affording undeniable proofs of the manner in which double teeth are constructed. The bicuspid are mitre-shaped, and in the furrow between their ridges decay frequently takes place. Deep or shallow lines in double teeth are hereditary; and before treating young teeth, those of the parents ought, if possible, to be examined for the sake of illustration and instruction. Deep lines

require more pains in cleaning than shallow ones, of course ; but they are more easily filled up with metal, without cutting or other preparation, and thereby placed on an equal footing with shallow ones.

FOURTH.—Molars—the molars, or large grinders, appear to be made up of a bundle of single teeth joined together throughout, except at their roots which separate into three in the upper, and but into two in the lower jaw, where so firm a hold of their sockets is not required. The parts of which a double tooth is composed commence ossifying as separate single teeth, and, gradually approaching each other, unite as they grow on together ; leaving furrows between, in the centres of which the enamel is often incomplete, or indented with cracks, in which moisture inevitably remains irremovable until it rots and softens the bone,—the vessel which contains it. As the molars are composed of a greater number of parts than the other teeth, all which are distinctly indicated by numerous ridges and furrows, they have a proportionally greater number of defects or weak points subject to be attacked by disease ; and consequently, strong

looking though they be, they suffer more than the other classes of teeth.

It cannot be repeated too often, that if it were possible habitually to wipe out and polish to the bottom the lines, cracks, and wells found in teeth, there would be no decay; and they therefore require to be filled up and levelled with some metal to render cleaning easy and practicable.

The following is a sufficiently near approximation to the periods at which the permanent teeth usually emerge from the gums, a difference of weeks or even months in the time of commencing and terminating being of little or no consequence, certainly not demanding uneasiness. Teeth make their appearance in pairs, or a tooth in each side of the jaw, placed at equal distances from the centre of the mouth; those of the lower, preceding their antagonists in the upper jaw, by a period of six months.

#### CHANGING THE TEETH.

At six years of age, immediately before the commencement of shedding the first set of teeth,

four large permanent molars make their appearance, one at either end of both jaws, being the sixth tooth everywhere from the centre of the mouth. These four molars form the first series of the twelve teeth which are never shed ; and which consequently neither have nor require successors, like the first or temporary set,—a circumstance deserving much attention in regulating the permanent teeth.

IN THE SEVENTH YEAR OF AGE—say at six and a half—the two central incisors of the lower jaw make their appearance, followed by their antagonists in the upper, in about six months after.

IN THE EIGHTH YEAR, the two lateral incisors of the lower jaw, the second tooth from the centre of the mouth in both sides, followed, as in the former case a few months after, by the two laterals of the upper jaw.

IN THE NINTH YEAR, two bicuspid, or small grinders, the fourth tooth in either side of the lower jaw, followed, as before, by their correspondents in the upper. It is noticeable here that the teeth which stand fourth from the centre of the mouth, make their appearance before the third or future eye-teeth ; and consequently the

greatest blunder that can be committed, in the management of dentition, is to remove the temporary eye-teeth at this period, in order to effect room in the jaws, since the permanent eye-teeth are in general the last of all the actual successors of the temporary set to make their appearance.

IN THE TENTH YEAR, two more of the eight bicuspid, one in each side of the lower jaw, followed, as before, by those of the upper, being the fifth tooth everywhere from the centre of the mouth.

IN THE ELEVENTH YEAR, but often in the twelfth, thirteenth, or fourteenth, and even later, the cuspids or eye-teeth, in the same manner as the others,—being the long missed, or perhaps forgotten third tooth, everywhere, from the centre of both jaws.

IN THE TWELFTH YEAR, four more large molars, one at either extremity of both jaws, being the seventh tooth everywhere from the centre of the mouth. These four molars form the second series of the twelve teeth that are never shed.

IN THE EIGHTEENTH YEAR, if there be sufficient room in the still growing jaws, if not, in any one of the six following years, four more large molars,

the wisdom teeth, -- being the eighth tooth from the centre of the mouth, in either side of both jaws. The wisdom teeth form the last series of the twelve teeth that are never shed.

The second dentition, as shown in the table given above, commences at six years of age, not, as is generally supposed, by exchanging first for second teeth, but by adding four permanent molars, teeth that never change, to their number. By which addition the complement of teeth in a mouth, immediately before the commencement of shedding, is raised to twenty-four; at which number, notwithstanding that twenty of them are shed and their places supplied with successors in the interim, it remains stationary for six more years, — when, four others, of the twelve that never change, are added, making the complement of teeth in a mouth, about the thirteenth year of age, twenty-eight, — or only four less than the entire set of permanent teeth. The remaining four are the wisdom teeth, whose period of cutting the gums is at eighteen years of age; although, from want of room in the still growing jaws, they often have to struggle slowly into existence and that with difficulty not before the twenty-fourth year; thus

occupying as much time as all the rest of both dentitions put together, or twelve years ; for on dissection they would be found nearly completed at the early age of twelve, though destined to lie so long buried underneath the gums.

The twelve teeth which never change are the three large molars at either end of both jaws ; they cut the gums in three series of four teeth each at a time, with an interval of six years between the series, or at the respective ages of six, twelve, and eighteen years ; from which periods they derive the names by which they are now pretty generally distinguished, more especially the two first, while the last is still better known as the wisdom teeth.

It may not be out of place here to add, that each of the twelve teeth which are never shed is often attended by as much constitutional disturbance in passing through the gums, as the temporary teeth themselves in early infancy, and ought to be treated in the same manner. This is a frequent, though unsuspected, cause of illness about the seventh, thirteenth, and nineteenth years of age, and the reason is obvious enough those twelve molars, though belonging to the per-

manent set, are but first teeth after all which never change; and, as they have to force their way through unbroken gums, unlike second teeth for which the way is generally opened by their predecessors, the effect upon the constitution is the same as with cutting temporary teeth.

The objects sought to be attained in regulating the mouth during the period of changing first for second teeth—from the seventh to the thirteenth year of age—are permanent regularity in the dental rows, and exemption from disease to which the teeth are peculiarly liable, from well known causes.

There are three conditions of the mouth, in each of which the teeth may be said to be regular; and of which the most common, as well as most desirable is, when the cutting edges of the front upper teeth overlap those of the under; the second, when the front upper teeth meet their opponents of the lower jaw directly in the same perpendicular; and the third, when the upper teeth shut inside the bottom ones.

Irregularity of the teeth is, when some of them shut inside, and others outside the opposing row; when there are apparently too many teeth for the

size of the dental row, or when teeth are absent in one side, while those corresponding with them in the other remain, so as to destroy the usual graceful uniformity of the two sides.

In the first, or most perfect, form of mouth if a slip of paper be placed between the front teeth with the intention of holding it fast, the paper can, nevertheless, be pulled away untorn in spite of the holder, providing the teeth be kept shut in their natural position. The front teeth of both jaws only seem to touch each other during mastication; for, if they did, they would necessarily wear each other down at every point of contact. When in proper condition, they cannot come into actual collision, unless it be like a pair of scissors. Front teeth, however, do sometimes touch severely, from the loss of numbers, and grind each other down; or, what is even worse, they loosen each other, when, from deficiencies in their rear, the pressure falls on the front. Effects like these are sometimes produced by the habit of playing with one's teeth, cutting threads, &c.; touching and grinding them away in wrong places. The trick of twisting the mouth and playing with the teeth is very com-

mon ; and yet very few can be made to believe they are possessed with it, even when the effects apparent upon the teeth themselves afford undeniable proofs of its truth. If a slip of paper can be forcibly retained between both rows of front teeth when shut in their natural manner, there is mischief going on somewhere, which ought to be discovered and corrected in time. Either they are needlessly wearing each other down, or becoming loose ; which latter state is further attended with inflammation of the lining membrane of the socket—or periosteum of the tooth—which membrane, with repeated attacks, becomes thickened and fungous around the root ; and, after long continued neuralgic pain, as in the case of decayed teeth, ends at last in gum-boil and fistulous openings or extraction. The proper remedy for front teeth coming into unnatural contact is, in early stages to file away the points that touch—in more advanced ones to supply artificial molars to keep the pressure off the front, and to grind the food.

In the second example, as when the front teeth of one row meet those of the other in the same perpendicular, they grind each other down, as

far as the molars or back teeth in meeting will allow them to touch. After the loss of all or most of the back teeth, those placed in front are often worn down to the very gums, while, at the same time, unlike what happens in the other forms of mouth, they usually remain firm and useful to the last.

In the third example, where the front teeth of the upper row shut inside those of the under, the effect is produced called projecting chin. Projecting chin may be hereditary; but it can be produced by extending the chin playfully in early life, while the extremities of the lower jaw are still young, for they then yield to any impulse. The retreating or diminutive chin is, in like manner, easily produced by imitation: but both can be prevented, or greatly modified, by a careful nurse or ingenious dentist, if he be properly assisted at home.

Before attempting to lay down rules for regulating the second teeth, some readers may like to be informed of the different methods in use for the purpose; in order to enable them in some measure to judge for themselves in doubtful cases, and in the absence of such advice as they

can with confidence rely on. Any one may be called on to acquiesce in some proposed treatment of a case, quite contrary to their preconceived opinions ; and where, delay or hesitation might prove fatal to the future comfort and beauty of a mouth, or quite the contrary.

A nice point may be raised,—whether, for example, additional teeth, as well as the predecessors of the coming new ones, are to be extracted a year or even years before their legitimate time, in order to effect immediate room for full grown teeth, in a still growing jaw ; or whether it be a safer course to leave the case to nature, if not altogether, for a reasonable time, to depend on a due consideration of all the circumstances of the case. For although exceptional cases do take place, in which it may be necessary to remove a tooth or two prematurely, and abide the consequence—rather than allow a greater evil in the shape of some extraordinary irregularity ; it may often be consoling, in the absence of responsible advice, to know that no case of threatened irregularity can arise, in which it would not be safe to postpone active measures until about the conclusion of shedding, or even later. Be it remembered,

however, that this rule does not apply in cases of decay, which, once commenced, never ceases but with the total destruction of its victim, unless it be checked by art. And further, whether plates or other appliances are to be employed in cases of irregularity ; and if so, at what age, and what the chances without them ; whether decaying or otherwise imperfect teeth are to be filled with metal, or the diseased surfaces filed off, or whether, perhaps, an improved system of daily cleaning would not answer the desired purpose equally well ; or whether certain teeth must actually be extracted to prevent permanent irregularity, well knowing at the same time that premature extraction is the surest way to stop the growth of the jaw.

It may so happen that the only professional adviser, available at the time, may have the misfortune of being young in years or experience ; or, what comes to much the same thing, suspected of being so, when a second opinion would be at least desirable. The dentist however well qualified to perform the ordinary duties of his profession, may not have seen similar cases ;

or, at all events, conducted them to their legitimate conclusion; he may lack the power, or inclination even, necessary to explain his views, or to carry home conviction of their soundness to the minds of others, in order, if possible, to secure that hearty co-operation in conducting protracted cases, without which the best designs often fail, and the steps already taken prove worse than useless. Nothing can be worse than half measures in regulating the teeth at any time, but more especially during the period of exchanging the first for the second set; commencing, perhaps, with one system and ending with another, or with none at all, and so leaving the first intention incomplete—thumbs where fingers ought to be, or no thumbs at all. It cannot be denied but there is much in the appearance of many a mouth during its transition state to excite, if not just alarm, reasonable anxiety, at least in minds unused to such matters; and it is, therefore, but fair, patiently and considerately to afford every possible information and explanation that may tend to remove doubts from the minds of the guardians

of youth; in order to inspire confidence and secure co-operation, which is absolutely necessary to success.

The leading facts which the reader has to bear in mind are: that the number of teeth to be shed, or of the temporary set, is twenty; each of which has a special successor, called a second tooth. That the time required for changing these twenty teeth is five years, or four a year; two of them in the lower, followed by the two corresponding ones in the upper jaw, six months after. That the teeth exist, full grown, underneath the gums long before they make their appearance at the surface; during all which time, and for years after, the jaws continue to grow with the rest of the body, affording reasonable promise of abundant room in the end, however crowded the teeth may be at first; more especially, as eight of the second teeth are of smaller size than their predecessors of the first set. This last circumstance, occurring as it does towards the conclusion of shedding, is extremely favourable to the regular development of the second set; since temporary teeth, or even fragments of them, retained in their places until the

appearance of their successors, are well known to assist in expanding the jaws; while the premature loss of any tooth, even though a new one be buried under it, is equally well known to cause contraction of the jaw at the part,—to permit the approach of adjoining teeth—nature's method of correcting such defects—and to render necessary the extraction of one or both intruders; or to submit to permanent irregularity, with its great chance of decayed teeth.

Some children begin to cut their teeth earlier than others, a circumstance sometimes attended with this probable disadvantage, that, their jaws being less grown at the time, they run the risk of being more tampered with to obtain room than those who cut them late, or when the jaws are more grown. In the former case, additional teeth as well as the predecessors of the coming new ones—or four in all to make room for only two—are apt to be extracted a year or more before their legitimate time, in the vain hope of securing permanent accommodation for all; while in the latter, nature is permitted to follow its own course undisturbed.

The difficulty of the teeth arises mainly from

the circumstances, that they are produced by a different law from that which regulates the formation of the body; that the teeth and the jaws, in which they have to be arranged, do not always advance in their growth with equal pace;—the one being constructed on the largest intended scale at once, just as a house is built, while the other grows gradually larger with the rest of the body, like a tree, till it arrives at maturity; and every one knows that whatever has to grow may be stunted by accidental circumstances. The teeth may chance to be too large, or the reverse, for the jaws, or the jaws can be rendered too small for the teeth; hence the uncertainty, the necessity for management.

It strikes most persons as curious that such large teeth, as they appear to be on first cutting the gums, should ultimately find room in the jaws; and they, consequently, sometimes become impatient of nature's slow processes, and begin to tamper with the case. It may be instructive, therefore, and assist in removing delusion and anxiety, to take a peep inside the jaws of a child at five years of age. We shall there find the great number of twenty-eight teeth, huddled to-

gether, among the roots of the temporary set; two of them, perhaps, in some places piled above a temporary tooth, making three in the same perpendicular; and each of them as large, as far as their growth (like that of the moon) has proceeded, as ever it can be. The edge of the jaw-bone may be compared to a crescent of houses in progress of building, some of them completed, others nearly so, and some few with only their foundations laid. The roots, the last parts of teeth which are completed, are deferred until the proper period for each pair, one right and left, to emerge into visible existence; when, unlike anything else, they have to perform adult duty from the first moment of their birth. Hence the necessity for the growth of the teeth by a different law from that of the rest of the body, and for their attaining maturity while yet buried in the security of the tender jaws of infancy; hence the necessity for two sets, since teeth cannot grow in safety at the surface.

11 The value of the temporary teeth, in preserving room for their successors, cannot be over-rated; and yet, most persons appear to be surprised when informed that shedding teeth require, and

ought to have, the same care bestowed upon them as the permanent ones, for the full period of their brief existence. They begin to cut the gums when a child is six months old, and the last of them is not expelled before the thirteenth year of age ; during all which time, with intervals of repose, some children suffer much, not from teething only which is inevitable, but from decay which can be prevented. The decay of teeth in no way favours their falling out, which is the result of absorption of their roots at the proper time,—a process attended with no pain.

In addition to the other injuries inflicted on the mouth by neglecting first teeth, “because they are to be lost at any rate,” the earliest of the permanent teeth often suffer along with them. Before the commencement of shedding temporary teeth, there are already in the mouth four of the large molars that never change, and which, owing to their very early coming, are frequently mistaken for shedding teeth ; and, like them, unfortunately too often permitted to decay. These four teeth, therefore, the sixth from the centre in either side of both jaws, are, in general, a greater source of suffering to mankind,

than the decay of all the other teeth put together.

Although there is no reason to suppose that these six-year-old molars were not intended to last as long as the other permanent teeth, since nature has made no provision for their dropping out, they are frequently, advisedly, extracted to afford greater room to the rest; especially, if the jaws promise to be too small, or the teeth much inclined to disease.

If we now assume a case of changing first for second teeth, as laid down in the table given above; and follow it throughout all its stages, from its commencement in the seventh year of age, till its conclusion in the thirteenth,—substituting figures for teeth, and in the natural order in which they ought to stand in the jaws, the reasoning on which what is understood by “regulating the teeth” is founded, will be still more readily understood. Let us further suppose the whole of the temporary teeth to be in a sound state, and still in their places; or, at all events, the roots of such of them as happen to be decayed, for even roots assist in preserving room for the second teeth. But some will ask why re-

gulate the teeth any more than the rest of the body ; seeing that nature rarely fails to complete this part of her work, like all others, in a perfect manner when left to her own resources, and that interference is often as likely to lead to harm as to good. In reply to which it will be sufficient here to state, that cases do frequently occur in which the teeth are irregular and decayed, without interference, a condition which could be prevented, and can be rectified by human care.

CASE OF CHANGING FIRST FOR SECOND TEETH.

Teeth Nos. 6 in the jaws.

The teeth, number six in either side of both jaws, or six-year-old molars, emerge from the gums at six years of age, and commence the second dentition. These four teeth never change ; and, consequently, they neither require, nor have, successors.

Teeth Nos. 1 in the jaws.

The two central incisors, or first tooth in either side of the lower jaw, and first to change, emerge from the gums, according to our assumed table, at six and a half years of age. They are some-

times later, however, by several months, or even a year or two, but without sustaining or causing any injury in consequence. If, when they begin to appear in sight, at whatever age that may occur, the two central incisors of the temporary set, their predecessors, have not already fallen out, they ought now, but not before, to be extracted,—as well to prevent the formation of a double row, as to be out of the way of the coming teeth; and the jaw, however crowded with teeth, ought then to be left in that state for another year at least, or until the new teeth, number two in either side, come in sight. The new front teeth are larger than their predecessors, the temporary ones, and, as they sometimes make their appearance before the jaws have grown sufficiently to receive them at once into the dental row, they are in such case forced to take up a false position for a time behind it. But the jaws continue to increase in size, while the teeth remain stationary,—and all teeth have a natural tendency to get into their right places,—so that, as no other new teeth need be looked for in the same jaw for another year to impede their progress, there is reasonable ground to anticipate

that the new teeth will get into their intended places by that time ; without having recourse to the extraction of additional teeth, as is sometimes done, or four in all, to make immediate room for two full grown teeth only in a still growing jaw.

It must not be forgotten that each of the shedding teeth has its own special successor, to come at the right time and in the right place, if there be room for it,—that its presence, up to the last moment of its natural life, favours the expansion of the jaw, while its premature absence causes the part to close up, even though a new tooth lie buried underneath ; that, in short, there will be less room for any new tooth, whose predecessor has been prematurely removed, than for one left altogether to nature.

When the teeth, number two, in each side of the lower jaw happen to be extracted in the seventh year of age along with number one, to make room for the new numbers one only, the system of forcible and premature extractions is then fairly commenced, and must, in all probability, be continued throughout the whole remaining course of changing the teeth ; and that

too, in most cases, without any necessity whatever. For why should not the jaws continue to grow to a certain extent, just enough to show the defect, along with the rest of the body? The system here alluded to renders inevitable the sacrifice of four (permanent) bicuspids—the fourth tooth everywhere from the centre of the jaws, however good, to make room for the cuspids or eye-teeth, the third from the centre; even though the first series of large molars, when they happen to be decayed—a too frequent occurrence—must be extracted in addition.

Teeth Nos. 1 of the upper jaw.—The two central incisors of the upper jaw usually make their appearance about six months after those of the under; and the same plan of treatment ought to be pursued with them, with this important addition, that in shutting the mouth the upper front teeth be made to overlap those of the under, to prevent an unpleasant irregularity. This can often be effected by the use of an ivory wedge, which may be employed as a bridge for conducting the upper tooth over the under; or of a plate, which can be made and applied by an ingenious dentist. In cases, long delayed,

and much crowded, it may become necessary to remove an adjoining tooth for the sake of room, and abide the consequences, as described by Mr. Nicholles at p. 176, &c.

Teeth Nos. 2 in the jaws.

The two lateral incisors, or second tooth in either side of the lower jaw, and second to change, make their appearance a year after the teeth numbers one, at whatever age they may happen to come; or in the present case, according to our table, at seven and a half years of age. If, on their appearing in sight, their predecessors, numbers two of the first set, have not already fallen out, they ought now to be extracted, for the reasons already given under No. 1; and the jaw, however much crowded, then left in that state, for several years; or until the new eye-teeth, numbers three from the centre, make their appearance in the eleventh year of age or later, unless there be some good exceptional reason for the contrary.

If, however, their predecessors have been extracted prematurely along with those of the central incisors, or four teeth in all in the seventh year of age to make room for two only,—and that

the temporary eye-teeth have, in consequence, come wrongly forward into the vacant places in the interim, and filled up the dental row without them, no alternative remains but to extract the intruders, the temporary eye-teeth; or six in all to make room for four only some years before the natural time, and abide the consequences—usually the extraction of permanent teeth.

This, the eighth year of age, is generally the turning point, in the management of the second dentition; for if the primary lateral incisors, numbers two from the centre, have been prematurely removed, and that the temporary eye-teeth, numbers three, must now be extracted to make room for the new numbers two, the same severe—but rarely necessary—system of extraction must be followed up to the conclusion of shedding; to end in the loss of four permanent teeth at least, as a matter of course.

Teeth Nos. 2 of the upper jaw may be expected six months after those of the lower; and, for the sake of uniformity, ought to be treated in the same manner, with this important addition when required,—that the upper front teeth be made to overlap those of the under jaw when the

mouth is shut, to avoid the alternatives of a projecting or retreating chin, or of the teeth of both jaws meeting vertically on their cutting edges.

It may be consoling to anxious parents, placed out of the reach of immediate advice, to be informed; that all irregularities of this description can be rectified with tolerable facility, up to the conclusion of changing the teeth, and even later; but they must never forget that the prevention of decay depends upon a scrupulously perfect system of daily cleaning from the beginning.

Teeth Nos. 3 in each side of the lower jaw—the eye-teeth—make their appearance, according to our table, in the eleventh year of age—three years after the lateral incisors, numbers two, next to which they stand,—and one year after the bicuspid, fourth from the centre, and nearest to them on the further side.

If a temporary eye-tooth, then, be extracted prematurely, that is, before its successor, the new number three comes in sight, the bicuspid number four, an earlier-cutting tooth, is sure to have approached the lateral incisor, number two, in the interim, and filled up the space irregularly, which

was intended for number three, hitherto buried deeply underneath the gum ; so that, when at last the new number three arrives outside the dental row, no alternative remains but to extract number four, however good, to make room for it. And even then if number four be extracted before number three is quite prepared to assert its own right and take its proper position, the space will speedily close up ; so much, perhaps, as to render it necessary to remove another tooth, number five, in addition.

The evil does not always rest even here ; for if the six-year-old tooth, number six from the centre of the mouth, be diseased,—a culpably frequent occurrence,—it becomes necessary to extract it also at some period or other of life, either for appearance or relief from pain, as the case may be. In this way it is quite possible to lose four teeth in all, in one quarter of the mouth alone for the accommodation of one eye-tooth ; and if, for the sake of uniformity of appearance, the same principle be extended to the other three quarters, partially or completely,—for the scruples of the patient have to be considered,—the effect can be conceived as neither pleasing

nor desirable,—for even a mouth may possibly be too small in proportion to the rest of the body.

It would be quite possible, if number six were decayed and unworthy of preservation, while numbers four and five remained sound, to make room for number three by the extraction of number six ; but then the trouble of forcing numbers four and five backward in the jaw, for that purpose, would be so great, and the co-operation of guardians so uncertain, that few dentists could be found bold enough to undertake the risk of accomplishing it. An easy method of finding room for number three would be to extract number two in front of it ; but no one would be so unjust as to have recourse to that plan who could effect the desired object by any other course, and yet it cannot always be avoided.

The teeth Nos. 3 of the upper jaw, or eye-teeth, may be expected six months after those of the under ; and it is unnecessary to add, that the same treatment ought to be pursued, in their management, with this important addition, that the teeth of the upper jaw overlap the bottom ones in shutting the mouth. The six single front

teeth of the upper row must be made to shut outside the bottom row, any other arrangement being, at least, undesirable.

Teeth Nos. 4 in either side of both jaws,—bicuspid or small grinders.

The first series of four bicuspid, for there are eight of them in all, make their appearance, according to our table, in the ninth year of age, a year at least before the eye-teeth, or numbers three in front of them; and if from any cause the temporary eye-teeth have been lost prematurely, the bicuspid slip forward into the vacant spaces, and so lay the foundation of their own destruction, for they are the teeth usually extracted to make room for the new eye-teeth when at last they do come.

An interesting peculiarity of the bicuspid is, that they are smaller than their predecessors of the temporary set, as if so intended for the purpose of affording additional room to the other teeth, about the conclusion of shedding, up to which time they are frequently much crowded. If numbers three, or the eye-teeth of the temporary set be still in their places, on the arrival of the bicuspid, numbers four of the permanent, they

ought to be allowed to remain until their own proper successors, the permanent eye-teeth, make their appearance. A safe rule is, never to remove a temporary tooth until its successor appears in sight, unless there happens to be some accidental pressing cause for such interference.

The bicuspid of the upper jaw may be looked for, as usual, six months after those of the lower; but it must not be lost sight of, that numbers three in front of them frequently put off coming till the twelfth, thirteenth, and fourteenth years of age, and even later, and that room must be found for them at any sacrifice at last.

Teeth Nos. 5 in either side of both jaws,—bicuspid like Nos. 4.

The second series of the bicuspid of the lower jaw make their appearance, according to the table, in the tenth year of age; followed, as usual, by those of the upper six months after. These bicuspid are the small grinders which succeed the largest and farthest back molars of infancy; on the fall of which they afford abundant room for all the other teeth, hitherto, in all likelihood, much crowded. Though fifth in the jaw, they are usually fourth in cutting the gums; the eye-

teeth, numbers three from the centre, being in general, the last to change.

Teeth Nos. 6 in either side of both jaws, but in point of time of cutting the gums, the first of all the second set. They are the first series of the twelve teeth that never change, nor have successors when extracted.

The sixth tooth in either side of the lower jaw, or six-year-old teeth, make their appearance at six years of age, or before the commencement of shedding the temporary set; followed by their opponents in the upper jaw six months after. An important part of their function is to fix the point of approach towards each other of the upper and under jaws on shutting the mouth, during the whole period of changing first for second teeth; and consequently, the length of the face for life. Without them, on the falling out or breaking down of the temporary molars, and before their successors, the bicuspid, could rise above the gums to the former height of the fallen molars, both jaws, now stripped of back teeth, would meet in mastication, so nearly, and with such force, as to change the direction of the new front teeth. Instead of overlapping vertically, as

they in general gracefully do at present, the upper front teeth would then stick out at nearly right angles to the facial line, and destroy one of nature's most beautiful features. The length of these six-year-old teeth (and teeth can be kept down by force) determine not only the form of the mouth in front, but the height above the gums which it is possible for all the rest of the molars to attain, and consequently the length of the lower part of the face. When back teeth are either short, or deficient in numbers,—the latter is a common occurrence in after life, from sheer neglect—those of the front are forced to point outwards, or to become loose.

A sad feature in the fate of these six-year-old molars is that, owing to their early appearance in the mouth, they are frequently mistaken for shedding teeth, and like them, permitted to decay. For it cannot be expected that parents should know the difference between temporary and permanent teeth ; nor that temporary teeth ought to be preserved for the full period of their intended career with the same care, and by the same arts, as permanent ones, to assist in preserving and making room for their successors.

The attention of parents is rarely called to the state of their children's teeth until new ones are seen coming up in wrong places, or old ones not dropping out when they ought; by which time, it is often too late to save the six-year-old molars, which may happen to be hopelessly decayed, and unworthy to be preserved, were it even possible to do so. And then comes the mental struggle, with much vexation, for having so long neglected them. No alternative now remains, however, but to extract them all at once, for the sake of uniformity; or one by one, occasionally, up to the period of cutting the twelve-year-old teeth, when urged by pain or inclination to submit to the operation.

These four teeth are frequently so badly managed as to be a more continuous and greater source of suffering than all the others put together. This circumstance has given rise to the practice, often recommended, of extracting them at any rate for the sake of greater room to the rest; and no bad practice either, if the teeth be disposed to disease; provided the proper time for removing them be selected, as in that case the twelve-year-old molars, numbers seven in the jaws, will come

forward into their places ; and, as their shape and size are the same, look nearly natural there.

If the interiors of the infant jaws could be examined at the time of birth, the rudiments of the six-year-old molars as well as those of the front teeth, would be found already there—in addition to the temporary set ; and the latter, even then, far advanced towards completion of their enamel. Defective enamel is produced by general bodily derangement at the time of its formation ; and is consequently found upon those parts of all the teeth which are being formed, underneath the gums, at the same time. The illnesses attendant on the first dentition, for example ; or, perhaps, the remedies required for their treatment, will thus act upon the enamel of the second teeth. By means of it we can trace with tolerable accuracy the number, periods, and duration, of the attacks of illness experienced by a child in early infancy. Rocky teeth, when carefully cleaned from earliest life, the deepest holes being filled with metal, are afterwards preserved with nearly the same ease as perfect teeth, though they may not look quite so nice.

Teeth Nos. 7 in both jaws.

The seventh tooth in either side of the under jaw, or twelve-year-old molars, make their appearance at twelve years of age,—the conclusion of shedding ; followed, as usual, six months after, by their opponents in the upper jaw ; from which circumstance they derive their name of twelve-year-old teeth. The twelve-year-old molars constitute the second series of the twelve teeth that never change, nor have successors when extracted. In size and appearance they resemble the six-year-old teeth ; and, when the latter, or sixth tooth, everywhere, from the centre of the jaws, happen to be extracted, before the arrival of the wisdom teeth, or eighth from the centre, they—the twelve-year-old teeth—seventh from the centre—come forward into the vacant spaces, and look nearly natural there.

In very small jaws, when the wisdom teeth come badly, the twelve-year-old molars, as the easier alternative, are sometimes advantageously extracted to afford them room. There is, in fact, but small difference in the appearance of the three large molars at either end of both jaws ;

which conformation renders it a matter of indifference, when extraction is advisable, and in the absence of disease in either, whether the first, second, or third, is to be the victim for the common good.

Teeth Nos. 8 in both jaws.

The eighth and last tooth in either side of the lower jaw, or wisdom teeth, make their appearance at eighteen years of age ; followed, as usual, by their correspondents in the upper jaw six months after. These molars make the last series of the twelve teeth that never change nor have successors. They cut the gums at eighteen years of age, if there be room for them ; which, owing to the slow concluding growth of the jaws, is not always the case ; and they, in consequence, often have to struggle painfully into existence, and with more irregularity as to time than any other teeth,—as late as two, four, and six and twenty years of age, and even later.

The wisdom teeth, deeply buried at the extremities of the jaws, and unable, for want of room, to reach the surface, though pushed on from below by the addition of their roots, often occasion dull neuralgic pain which, by long continuance, fre-

quently occasions general disorganization and derangement of the bodily system. About the seventh, thirteenth, and nineteenth years of age, are common periods of much latent suffering, without any apparent assignable reason, except the growth of teeth; which then, are being formed underneath, and have to pierce the gums in new places for the first time, as in the case of the temporary teeth in early infancy, and with the same results. The proper treatment is to cut the gums down to the teeth as often as they ache, or in very bad cases to extract the teeth immediately in front of them to afford relief.

It only remains further to add a few extracts from those well known authors who have written most strongly *for* and *against* the system here advocated, in order to afford to the guardians of youth a better opportunity of judging for themselves.

Mr. Nicholles, the most decided opponent of the system advocated above, observes, in his small treatise, that "The temporary teeth are seldom" "shed fast enough, and the consequence is, that" "the permanent teeth, not finding their na-" "tural opening, shoot out in a false direction."

“ As a general rule the safest practice is to ”  
“ extract the four temporary incisors ; a few ”  
“ months subsequent to this it becomes of ”  
“ the utmost importance to attend to the forth- ”  
“ coming lateral incisors. To make room for ”  
“ the lateral incisors (the second from the ”  
“ centre) it is requisite to remove the tempo- ”  
“ rary eye-teeth (the third from the centre of ”  
“ the mouth), in each jaw ; when the child, as ”  
“ far as the four front teeth are concerned, may ”  
“ be considered in a perfect state of safety. We ”  
“ have now arrived at a period when twelve of ”  
“ the temporary teeth, six in each jaw, have ”  
“ been removed, and when eight of the perma- ”  
“ nent set, four in each jaw, have taken their ”  
“ proper places, leaving eight more temporary ”  
“ teeth to be shed. It is advisable to remove ”  
“ the primary grinders (the fourth and fifth from ”  
“ the centre of the mouth), and as they occupy ”  
“ a much greater space in the circle than their ”  
“ successors, their extraction will also make ”  
“ room for the eye-teeth (the third from the ”  
“ centre). Without considerable attention defor- ”  
“ mity is apt to take place on the advancement ”  
“ of the upper eye-teeth. Room, in such cases, ”

“ must of course be made for them at whatever ”  
“ expense ; and as there are no longer any tem- ”  
“ porary teeth to be removed, it becomes a ”  
“ matter of serious consideration what teeth ”  
“ ought next to be extracted.”

The following extracts, from well known works, tell powerfully in favour of the author's views. Mr. Murphy forcibly observes that “ Premature ”  
“ extraction often produces an effect quite con- ”  
“ trary to that intended ; as in such cases the ”  
“ gums and alveolar processes shrink back to ”  
“ the permanent teeth, which have not come ”  
“ forward, so that the space, instead of being ”  
“ enlarged, becomes contracted.”

And Mr. Fuller states as his opinion, that  
“ No dentist of respectability would extract ”  
“ shedding teeth before the permanent ones ”  
“ appear ready to occupy their place ; at least ”  
“ not without strongly protesting against such ”  
“ an operation. Nor should children's teeth be ”  
“ prematurely extracted on account of toothache ; ”  
“ and until the proper time of removing the ”  
“ tooth we would recommend the usual pallia- ”  
“ tives.”

Mr. T. Bell observes that “ There is no subject ”

“ connected with the management of the teeth ”  
“ which has given rise to so much gratuitous ”  
“ cruelty, as that which regards the treatment ”  
“ or prevention of irregularity in the perma- ”  
“ nent teeth. It were well if the intentions of ”  
“ nature were more attended to in the regula- ”  
“ tion of the teeth, than has generally been the ”  
“ case. In this, as in every other circumstance ”  
“ in which surgical treatment is required, it ”  
“ should be recollected, that the legitimate ”  
“ object of the surgeon is confined to the appli- ”  
“ cation of remedies in a disease, or the regula- ”  
“ tion of the natural functions where they are ”  
“ deranged ; and it is not to be supposed that a ”  
“ process of so much consequence to the comfort ”  
“ and health, and essentially connected with a ”  
“ function so important as that of digestion, ”  
“ should be so imperfectly provided for, as to ”  
“ be constantly in need of such harsh and un- ”  
“ natural intemperance. I have known no less ”  
“ than eight, and even ten, firm teeth forcibly ”  
“ removed from the jaws of a child, at once. I ”  
“ will not employ the terms of indignation and ”  
“ disgust which such barbarous quackery de- ”  
“ serves ; but surely the unnecessary infliction ”

“ of pain, upon the plea of preventing an evil, ”  
“ which, in the majority of instances, there is ”  
“ not the slightest reason to apprehend, and ”  
“ which even where it might occur, can always ”  
“ be detected in time to obviate it, is of suffi- ”  
“ cient importance to deserve reprobation, even ”  
“ were the only injury which would result from ”  
“ the treatment recommended in the foregoing ”  
“ passage. But there are other and more im- ”  
“ portant reasons for avoiding the early removal ”  
“ of the deciduous teeth: the connexion between ”  
“ the temporary tooth and the succeeding per- ”  
“ manent one. If the temporary teeth be re- ”  
“ moved before the permanent ones are so far ”  
“ advanced as to be ready to occupy their situa- ”  
“ tion, the support of the alveolar processes ”  
“ being thus lost, the arch of the jaw contracts, ”  
“ and when, subsequently, the permanent teeth ”  
“ are fully formed, there is not room for them ”  
“ to range in their proper situation. I have ”  
“ seldom or never found any ultimate injury ”  
“ to result from leaving the first teeth even ”  
“ until the permanent ones had acquired con- ”  
“ siderable size, unless when the jaw itself has ”  
“ been ill-formed.” “The simple and uniform ”

“ principle is to leave the temporary teeth as ”  
“ long as may be, without risking the per- ”  
“ manent irregularity of their successors. I have ”  
“ often had reason to congratulate myself upon ”  
“ the result of having refrained from extracting ”  
“ permanent teeth until the age of fourteen or ”  
“ fifteen years should have decided whether it ”  
“ would be ultimately necessary. I have suc- ”  
“ cessfully treated a case of this description as ”  
“ late as between nineteen and twenty years of ”  
“ age.” In another part of his work, Mr. Bell fur-  
ther observes that, “The rudiments of the per- ”  
“ manent teeth, instead of being original and in- ”  
“ dependent, like those of the temporary, are, ”  
“ in fact, derived from them, and remain for ”  
“ a considerable time attached to, and inti- ”  
“ mately connected with them. I am led by ”  
“ this consideration, the more decidedly to de- ”  
“ precatate their too early extraction, with ”  
“ whatever object it may be proposed. We ”  
“ must not, however, disregard the injury which ”  
“ the extension of severe inflammations to the ”  
“ permanent rudiments may produce in the ”  
“ formation of the permanent teeth.”

## ARTIFICIAL OR FALSE TEETH.

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ARTIFICIAL teeth have now become as common as "household words," and require but little illustration. Artificial teeth are made to supply the place of lost teeth, as timber or cork legs are substituted for real ones, or wigs for the natural hair; and can be obtained from one to an entire set; their comfort and usefulness depending less on their apparent construction, than on the skill with which the design for each particular case is conceived and carried out. For it is possible, perhaps common, for artificial teeth, when they rock in their place, with, or without fastenings, to loosen those to which they are attached. The most perfect idea of a false tooth is, when the root of that whose place it is to supply remains firm in the

jaw. The root is filed close to the gum, and the new tooth, either a natural one, or mineral (china), is firmly fixed by means of a gold pin ; its duration afterwards depending partly on the soundness of the root, and greatly on the skill and experience of the dentist. If the root, as well as the tooth, whose place is to be supplied, be absent, the socket in which it was fixed is sure to be absorbed ; and the gum must consequently have retreated, leaving a vacancy that may possibly amount to three-fourths of an inch. In which case, some material must be found to fill up the vacancy occasioned by the retreating of the gum and socket of the tooth, and in that material the new tooth is generally fixed. The substance employed, as a sort of saddle, on which to fix the tooth, is either ivory or gold—the former when much substance and lightness are required—the latter when scarcely any substance is wanted—a condition partly depending on the amount of absorption of the socket which has taken place, and partly on the state of the remaining teeth. And so on, whether the case be one requiring one or many artificial teeth.

A new substitute for ivory has lately been found,

gutta percha, and patented ; which its inventor and others confidently anticipate will, in most cases, supersede the use of ivory, since it is so much more easily adapted to the vacant space by mere heating. A framework of gold is first roughly adapted to the part, and on it the teeth are rivetted in the usual manner. The skeleton thus prepared is then filled up to the required dimensions with gutta percha, instead of ivory. The idea of its ultimate success does not as yet pervade the general professional mind—but this, like most innovations, must be decided, as usual, on its own merits by the public themselves, who are the real parties concerned.

THE END.

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